THE IRON AGE

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Factory Workers as Agriculturists

Success of the Community Gardens Conducted by the Norton Companies' Employees a Solution of the Waste Land Problem

MANY manufacturing plants located in the suburbs or in small communities own considerable areas of land which is put to no profitable use, but is held idle pending the time when it will be needed for extensions of the works. Much of this property is well adapted for gardening; in numerous cases it was formerly worked as a farm. Many workmen are keen for the opportunity to till a little tract of ground during their spare time, and the owners have the chance to grant them the privilege, at no cost to them and at practically no expense to the company.

The plan has seldom even been considered in America. To be sure, individual employees have been given the right to farm company land, but an organized system has rarely if ever been carried out there, and, in connection with industrial works, and free of charge, probably as rarely in Europe. Community gardens are common enough across the water, but they are not under the patronage of the employer class. In Germany, where thousands of workmen and their families live in barrack-like houses, the custom is to rent and farm vacant ground, usually in communities which are assembled regardless of trades and places of employment. Sometimes the land is no small distance from the homes; not infrequently it is several miles away. Some of the men build shack-like houses on the premises, and with their families spend their week-ends there, cultivating their gardens and enjoying the open air and the fellowship of their neighbors. In England, too, colonies known as allotment gardens are frequently found in the suburbs of the industrial centers. But in every such case, in Germany, England and other countries, the men pay the land owners for the privilege.

The Norton Company, Worcester, Mass., is trying the experiment this summer of gardens for its employees. The established excellence and undeveloped possibilities of the European institution were recognized by officials of the company who have had the opportunity to study the plan at first hand, and it has been adapted on a broad and liberal basis. The success of the venture is already assured. In fact this is putting it very mildly. A great good has been done, with little cost to anyone outside of the expenditure of brainwork and muscular effort of the gardeners.

Early in the spring every employee of the company, and of its affiliated neighbor, the Norton Grinding Company, was offered the use of a section of land, on the sole condition that he should cultivate it. The company owns at Greendale a large area which formerly was a prosperous farm. It was acquired in order that ample room would be provided for the growth of the great works in years to come. The cream of this land, about 8 acres, was selected for the gardens—little farms is a better word for them. The ground was plowed and harrowed, and was laid out in lots measuring 50 x 75 ft., with suitable dividing thoroughfares and paths. The sections were numbered and appor-

tioned among the workers who made application.

The 89 men who accepted the generous opportunity represent a wide variety of kinds and grades of employment, both in the office and in the works. The company offered to furnish seed to anyone who could not immediately afford the purchase, reimbursement to be made later, but, it is pleasant to state, not one person asked the favor. In addition to the 89 individual gardens, the company cultivates five plots itself, for the benefit of the dining room in which luncheon is served daily. A pipe line was laid with taps at convenient intervals, so that water is available for use when there is a scarcity of rain, the supply being turned on from 4 to 8 a. m. and from 4 to 8 p. m. on the first five working days and all day Saturdays and Sundays.

It was realized in the beginning that the gardens could not be conducted to the best advantage of all without a definitely organized management, and so the Norton Agricultural Society was established as a governing body. Every holder of a tract was made a member and signed the rules and regulations, and became entitled to a vote, including the ballot for the supervising committee, which is the actual executive head. The rules and regulations, signed by this committee are reproduced.

The minute the weather permitted in the spring, the men went to work on their gardens, and in the early morning in the noon hour and after hours the farms were busy places. Saturday afternoons and Sundays the fields swarmed with people. The wives and children joined heartily in the task of giving final preparation to the soil, and in the planting. Even the babies were taken along and made comfortable in the sweet country air. In no case has ambition lagged. A weed is a rare form of vegetation on the premises, and noxious insects have a precarious existence. The restrictions embodied in the rules and regulations as to orderliness and neighborliness have not proved themselves necessary. Pride is the really controlling factor. Rivalry is keen, and amounts to actual competition, for the Norton Agricultural Society holds exhibitions at which prizes are awarded for the best specimens of vegetables. The first was given in connection with a picnic of the Norton Agricultural Society which was held on the farm, when the midsummer products were shown, the winners receiving cash prizes offered by the company.

The crops raised in the gardens are widely varied. Potatoes take the lead, a good deal of ground being devoted to this essentially important vegetable, which has thrived prodigiously, for the soil has proved itself particularly well

A Series of Views Taken in the Employees' Gardens at the Plant of the Norton Company Showing a Bird's-eye View of the Farm at the Beginning of the Season at the Top with Views of Some of the Gardens Being Cultivated Below. The Engraving on the Preceding Page Shows the Judging of the Products for Awards in the Prize Contest

adapted to the development of the staple. The list of products runs through corn, peas, beans, squashes, pumpkins, melons, lettuce, radishes, and, in fact, to the limits of the edible vegetables of the temperate zone of North America.

Some of the Norton farmers had had experience in gardening, while others were mere tyros. A spirit of cordial co-operation immediately developed in the community which has become a sort of school of agriculture. The skilled assist the unskilled by example and advice. The company co-operates with the men, and the men co-operate among themselves, which is a combination highly stimulating to efficiency, constituting an influence which cannot help extending from the gardens to the works.

Much of the farming may be classed as intensive, for the soil is made to produce a maximum. The amount of produce that can be raised on a comparatively small area is surprisingly large. The current expenses of these families for vegetables have been cut to nothing, and the cellars of many of them will receive a stock which should last through the winter. So strikingly successful have been the gardeners that the promise for next season is a community of twice the size.

Such a use of idle land owned by industrial concerns is of inestimable help to employees when times are poor and many of them cannot be given continuous work. And in these days of high prices for the necessities of life an auxiliary income may be of greatest importance to the man with a family even when business is at its best. He is not receiving something for nothing, beyond the free opportunity to engage for himself in the most wholesome of labor.

Norton Agricultural Society Rules and Regulations

1. Each man to whom a lot is allotted will become an active member of the society and will be entitled to vote at all regular meetings.

2. The acceptance of a lot signifies the intention of the person to comply with all the rules and regulations now enacted or that may thereafter be enacted by the society.

3. Seven members, including a chairman, all elected by the society, shall constitute a "Supervising Committee," whose duties it shall be to exercise a general supervision over the entire project, enforce the rules and regulations that are accepted by the society; to arrange, with the assistance of the company, for the purchase of any materials that may be needed; to assign the plots in a proper manner, and to serve the society in every possible way to the best of their ability.

4. Each member shall keep his plot weeded to a reasonable extent.

5. Each member shall keep his plot free from bugs or injurious insects.

6. Each member shall have proper regard for his neighbor planting, and in going and coming avoid injury to the other crops.

7. No member shall discard his refuse into another's plot, but into the swamp adjoining the plots.

8. Each member shall give his allotment sufficient attention to make its appearance in consistence with the general character of the others.

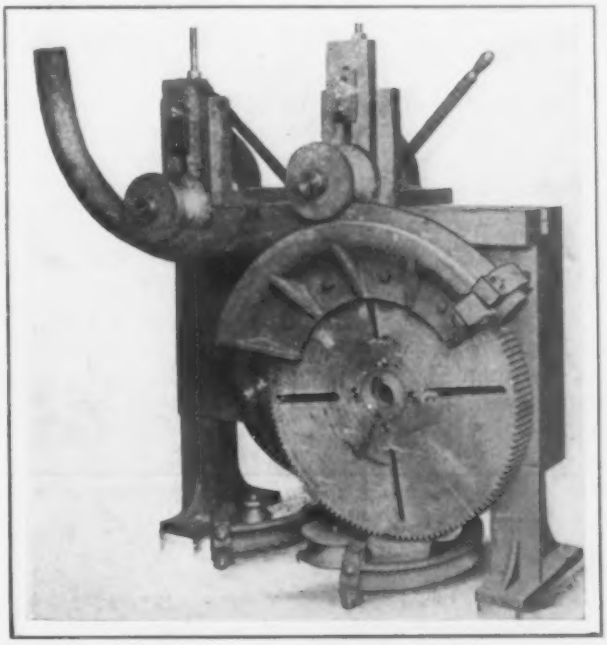
9. No member shall plant any closer than 18 inches from every partition boundary line.

Supervising Committee:

JOHN COLLINS, Chairman.
EDW. VAN DER PYL.
CHARLES STALKER.
CHARLES E. CODY.
ARTHUR LAPORTE.
WALTER S. LONGELY.
WILLIAM I. COLSON.

A Hand Machine for Bending Large Pipe

The line of pipe-bending machines of the Pedrick Tool & Machine Company, Philadelphia, Pa., has been recently increased by the addition of a machine for making bends in large diameter pipe.



A Recently Developed Hand Operated Machine for Bending the Larger Sizes of Pipe Up to 4 In. in Diameter

The construction of this machine is practically the same as the smaller ones already built, the same principles being employed with such modifications as are necessary to give the additional strength required for the bending of heavy pipe. It is pointed out that by using this new machine it is possible to accomplish the work in a shorter space of time and at far less expense than by the ordinary methods employed.

The main frame of the machine is a rectangular casting which is ribbed on one side and has large bosses for the gear shafts. The gears used are of heavy pitch with machine cut teeth of wide faces. The ratio between the various gears employed is large and permits hand power to be used. In operation the pipe to be bent rests in a quadrant which is attached to the face plate gear. There are two resistance rollers which have vertical and lateral adjustment, so that they may be brought to bear on the pipe at any desired point. The machine possesses enough power to bend a pipe 4 in. in diameter when cold and unfilled through an arc of 90 deg. In the accompanying illustration the machine is shown bending a pipe of this size on a radius of 18½ in., which is somewhat smaller than that usually called for in standard practice.

Newark Industrial Exposition

Newark, N. J., is to have another exhibition of its arts and industries. It will be held September 12 to 26, inclusive, in the armory, wherein the former very successful exposition was held. This year's show will probably not be confined strictly to industries within Newark's geographical lines but will embrace Greater Newark industries. A novel and most attractive plan for the exhibits has been created by the Exposition Association architects and the decorative and lighting effects are to be of surpassing beauty. Reservations of space have been so many that a highly representative exposition is assured. In all likelihood the exposition will become an annual affair, a permanent corporation having been formed with ample capital to conduct such an enterprise.

The Seat of War in Belgium

Industries of Liege — Machine Shops with American Tools— Belgian and French Cannon

——BY AN OCCASIONAL CONTRIBUTOR——

The determined defense of the Belgians at Liege was made doubly necessary by reason of the important artillery and small-arms works located there. The Belgian Government is almost wholly dependent on the Liege district for arms and armament.

IMPORTANT LIEGE INDUSTRIES

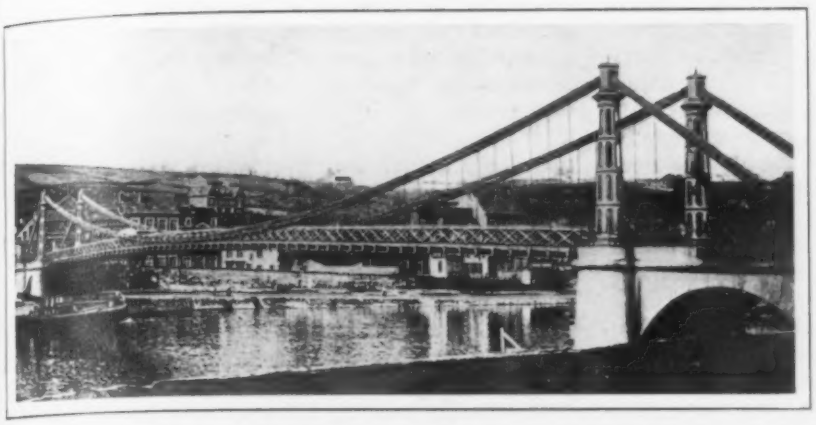
The great Cockerill Works (Societe John Cockerill) is located close to Liege at the suburban town of Seraing. Ordinarily the Cockerill Works gives employment to more than 10,000 men. The principal output consists of artillery and coast defense material. Belgium for a number of years past has added armored cupola defenses to her land fortifications, and the majority of these cupolas were built by Cockerill. The standard Belgian field-artillery gun is of Cockerill design and is known as the Cockerill gun. The caliber is 2.95 in. In addition to field-pieces Cockerill turns out large caliber guns for coast defense positions. The output at the Cockerill Works also includes locomotives, steam and gas engines, and a varied lot of railroad equipment. The plant is easily the most important in size and output in Belgium. Much of the machine-tool installation is not as modern as can be found in other Belgian plants, but of late years Cockerill has undertaken to introduce many American machine tools, and especially those of the automatic type, together with grinders and milling machines.

The Fabrique Nationale d'Armes de Guerre is located at Herstal, a suburb of Liege, and gives employment to over 3000 people. The rifles, carbines and revolvers used in the Belgian army emanate for the most part from the Liege district. In and about Liege are some 35 firms engaged in the production of sporting arms, the largest being probably the Pieper Works. This establishment has installed the latest types of machine tools obtainable and the equipment is largely American. The Pieper plant undertakes to do all work within its shop limits. Other shops arrange to have work taken to the homes of the workmen, under the idea that overhead charges are cut down. At such plants only assembling work is carried on.

Liege boasts of two important machine-tool works, namely, De Longdoz and Fetue-Defize. Still another plant, Jaspers, but smaller, is located there, and midway between Liege and Seraing is Req de Malzine, one of the best fitted up gear-cutting plants in all Europe. Ninety per cent. of the machine tools at Malzine are of American origin. The same statement may almost apply to the Melnotte Works, located a short distance to the north of Liege. At the last named plant almost the entire installation of tools came from the United States. The great machinery works known as the Meuse Works lies just outside the city of Liege, while within the confines of the town proper is the St. Leonard Locomotive Works, one of the oldest and best known in Europe.

Liege is indeed a great machinery section, and the closing of all the above plants may naturally be expected in consequence of the war—all but the gun plants, since the latter can be utilized so long as they can be held.

A Portion of the Buildings and Yards of the Cockerill Works



Suspension Bridge Over the Meuse River from Liege to Seraing, with View of the Cockerill Works

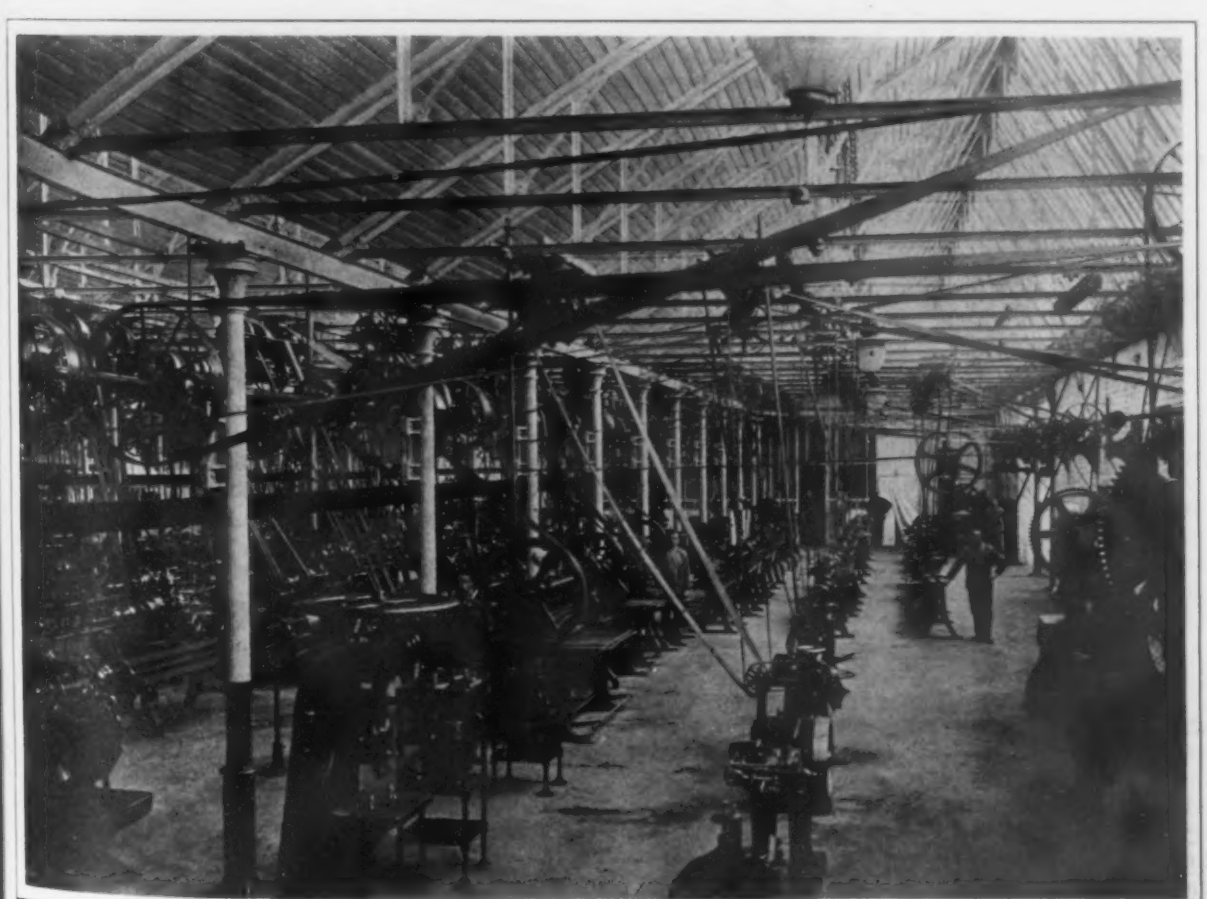
BELGIAN AND FRENCH FIELD ARTILLERY

The greatest importance is ascribed by military men to the part which field artillery will play in the present struggle. In 1870 France was clearly outclassed by Krupp wedge-block field guns. The French pinned great hopes on the mitrailleuse, a form of machine gun, but that weapon failed miserably at the very outset of the war. Private firms in Europe like Krupp, Skoda, Schneider & Co. and Cockerill have carried forward the development of field artillery year by year. Some idea of the advances made was first gleaned by the work of French guns in the Boer war. These pieces easily outranged the English standard field-pieces. The French guns in the hands of the Boers were Schneider pieces manufactured at Creusot, France. In the late Balkan war the Servians did remarkable work with still later makes of Schneider guns.

There is a popular impression that the French army is equipped with field guns of the type made familiar by the Servians and the Boers. This is erroneous. The French Government gun is manufactured at the Government arsenals and under no circumstances can it be purchased. The greatest secrecy surrounds the manufacture of this weapon, and it is the rule to keep the guns well covered with tarpaulins when on parade. French ordnance officers superintend all steps of the manufacture of these pieces, and there is no letting out or contracting on the part of private plants.

The field guns in use throughout the European services to-day all employ the long recoil system; that is to say, the gun carriage is immovable. In the case of guns not so equipped there is necessary a running of the gun into battery again after each discharge. The long recoil guns have the recoil taken up in cylinders either placed under the carriage or along the trail. The mechanical arrangement differs in different services, but the principle is the same, namely, to hold the gun carriage rigidly in place, and to allow the gun to recoil on the carriage, without moving the carriage. The energy of recoil is utilized to run the gun out after each discharge to its normal position on the carriage.

The effective development of the long recoil field carriage only began after 1897, when France had adopted her model of that year. When long recoil was first attempted, hydraulic transmission was tried, but the complications proved to be too great



Machine-Tool Installation at the Melnotte Works, Remicourt, near Liege. Mostly American Tools Are in Service in These Works

and recourse was had to spiral springs. These springs were applied in the recoil cylinder in layers, with telescopic tubes. Ehrhardt, a German artillery manufacturer, tried to do without the tubes by winding the springs in the opposite direction, but this system has not been followed to any great extent. England purchased Ehrhardt guns during the Boer war, as her own pieces were recognized as having been outclassed.

In the late Krupp guns the action of the recoil is transmitted directly on a single spring without any of the complications arising through affording transmission between recoil and counter recoil. The brake piston rod of the Krupp field gun is held in the head of the cradle by a nut, and the brake cylinder is fixed to a lug at the breach of the gun. The spiral spring of flattened wire surrounding the cylinder is retained by the bottom of the cradle in the rear and compressed by a collar on the brake cylinder in front. The recoiling gun, pulling the cylinder back through the rear plate of the cradle, compresses the spring. There is no transmission, and recoil and compression are of equal length.

SHRAPNEL FIRE

The object to be attained by modern field artillery is effective shrapnel fire. The majority of the European field pieces have a calibre of 2.95 in. and throw a shrapnel projectile weighing about 14½ lb. This shrapnel shell is fitted with about 260 bullets, and experience shows that those bullets, to do effective work against men and horses, must have a striking energy of about 700 ft.-lb. The walls of the shrapnel shells are thin. Only a small bursting charge is necessary to tear open the walls and release the bullets. The bullets do not gain an increased impetus or velocity in consequence of this bursting of the shell; on the contrary, the velocity of the bullets following the burst is the velocity of the shell proper.

Shrapnel is burst over and short of the object fired at, and is designed especially for use against troops in the open or sheltered behind light screens. By being burst over earthworks, the bullets will search out the troops sheltered behind. The Boers found the English shrapnel so searching that they had recourse to digging their trenches at a slope, the bottom of the trench sloping toward the enemy.

The question as to the range of shrapnel depends on the initial velocity of the projectile. There is a maximum velocity dependent upon the firing charges of the gun itself. It is understood, however, that the new French guns have an effective shrapnel range of 6000 yd. It was not many years ago when 3500 yd. was considered a good shrapnel range.

The effective use of shrapnel as in evidence today was unknown in the United States during the civil war. Solid shot and shells carrying lighted fuses were used for long-range work, and grape and canister for close work. The cannoneers stood up in the open. The caissons stood about 15 to 20 yd. in the rear, and men ran with the charges between the caissons and the guns.

MODERN PROTECTION TO GUNNERS

All this is changed today. Instead of the caissons being in the rear, the French and Belgians place the gun caissons alongside the guns, and not more than two to three feet away. The guns are provided with shields, and after the first shot the gun is rigidly planted in the ground. Two men operate the piece, one to train and fire and a second to load and eject the empty cartridge case.

The gun caisson or limber is up-ended much like a dump cart, only the ending of the caisson body is made complete; that it to say, it stands almost perpendicular to the ground and not at a slant. The projectiles when carried on the march have their heads down, but with the running of the caisson into battery and up-ending the cartridges lie parallel to the ground. The top of the caisson consists of two doors, which swing outward when the caisson is up-ended and form wing protections for the gunners who serve out the ammunition.

The bottom of the caisson and the wing doors are of light steel construction, not over ¼ in. in thickness, and are impervious to steel-jacketed bullets of the standard military rifle.

Three gunners kneel behind the protecting bottom of the caisson. They are completely sheltered from rifle fire. Two of these men pass out the ammunition; the third cuts the shrapnel fuse to the required number of seconds. As a rule the time of flight does not extend beyond 22 seconds, and for ordinary shrapnel service 10 to 12 seconds are employed. It all depends on the distance of the enemy. Good practice demands that the shrapnel be burst at a point about 150 yards short of the object fired at. The effect is to release the small balls within. The bullets then rush on at the full remaining velocity of the shell in the form of a sheaf, and strike the ground within a rectangle about the size of an ordinary company formation. The dispersion of the bullets is regulated largely by the position of the bursting-powder charge. In the case of some makes of shrapnel the bursting charge is in the head of the projectile, while in other designs the charge is at the base of the shell. Shrapnel shells are in a number of services provided with percussion fuses in addition to the time mechanism. This insures the bursting of the shell when striking the ground.

RAPIDITY OF GUN SERVICE

In the Belgian and French plan of placing the caissons when in action alongside of the guns there is gained great rapidity of service, and a rate of 14 to 15 aimed shots per minute is readily obtainable. An even higher rate of fire can be conducted, but 14 aimed shots are perfectly practicable under varying conditions. By keeping the caisson close up to the guns there is avoided any exposure of men in running with ammunition to the guns. Opponents of the practice point out that if the caisson is exploded by a shot from the enemy it will probably also destroy the gun, but there is no knowledge, so far as known from experience, that the same thing would not happen if the caisson were exploded 15 yd. in the rear of the piece. The target presented by caisson and gun on the same front line is regarded as hardly more dangerous than a deep target afforded by placing the caisson 15 yd. to the rear. Incidentally, it may be remarked that the latter practice has been followed in the United States service, but many artillery officers believe that the Belgian and French method is preferable. In the French and Belgian practice the horses are moved off to the rear 200 or 300 yd., if necessary, wherever protection can be found in some hollow of the ground. Both the Belgians and French resort to indirect fire; that is to say, guns are sheltered behind a knoll or ridge, or, if necessary, sunk in pits, and the fire is directed by the battery commander from wherever he can best see. It is not necessary that the gunners have more than the range, time of flight and direction of fire. The battery commander watches the burst of the shrapnel. If it is too short, he forks the object fired at by an increased range, and then reaches the object on the third shot by taking a mean of the two ranges. Seldom more than two trial shots are required.

The Krupp guns train through 8 degrees of arc without any necessity for shifting the carriage. French guns have greatly increased this train by having recourse to two additional trail flasks which are spread out V-fashion in rear of the gun.

FRENCH LONG RANGE GUNS

It was General Langlois of the French army who is regarded as the father of the present-day French army field-practice. This officer for several years urged upon the French Government the developing of a gun which should be superior in range and rapidity of fire to any field-gun in the world. His arguments and claims that the thing could be done finally resulted in the War Ministry taking the matter up in earnest. Langlois, as a practical artillerist, indicated what was required, and what should be striven for, and Colonel Dupont, a renowned ordnance engineer, was assigned to work in conjunction with him. These two officers have evolved the field-piece which France now possesses and on which France depends for her armies to win in the field. The great Puteaux arsenal is responsible for many of these guns and it may interest American machine-tool builders to know that American arsenal tools constitute the bulk of the equipment utilized in the fabrication of these pieces.

Lord Roberts is quoted as saying that the Boer war taught the necessity of having long-range guns with armies in the field. This necessity was felt when opposed to the Schneider guns of the Boers, the lighter guns having been outclassed. It will be recalled that the English sent to the front 4.7-in. and 6-in. naval guns taken from British cruisers and improvised carriages for the use of those guns on land. It is doubtful if any such disparity will arise between field guns in the various European services, but it is apparent that Krupp 75-millimeter (2.95-in.) field guns are unequal to attacking armored cupolas such as are found in the defenses of Liege. Against such defenses heavy pieces are needed and then recourse must be had to specially built armored flat cars running on railroad tracks and of sufficient strength to withstand the heavy shock recoils. Such carriages, it is understood, exist, but the difficulty is to transport these armored trucks to the front, especially when railroads have been torn up, bridges destroyed and roads damaged so as to prevent any rapid reconstruction. Against armored cupolas of the Belgian Cockerill type 8-in. guns, it is estimated, alone will suffice and these 8-in. guns approximate 15 and 20 tons in weight.

The Buckeye Engine Company, Salem, Ohio, one of the oldest and largest manufacturing enterprises in that city, went into the hands of a receiver August 8. The three banks of Salem started the action. The county court appointed Hiram Greiner, secretary and treasurer of the company, receiver, and it is understood that the plant will continue to run under permission of the court. The petition filed does not set forth that the company is insolvent, but sets up that the best interests of all the creditors can best be conserved by taking this action. The Buckeye Engine Company has been credited with doing more than any other one industry to build up Salem.

The Sil-Tin Mfg. Company, of which William J. Quaid is secretary, 2850 North Twenty-third street, Philadelphia, Pa., is exploiting a new process for tinning and re-tinning, discovered by a resident of that city. It is stated that the use of this process gives tin, when used for a coating on steel, a brighter luster than nickel.

Chrome-Vanadium Rolled Steel Wheels

In *The Iron Age* for November 13, 1913, an account of the physical and other properties of a consignment of heat-treated chrome-vanadium rolled steel wheels which the Grand Trunk Railway had secured for experimental purposes was given. Some data regarding the results are now available.

The object was to definitely determine the relative merits of different types of tender wheels under the difficult conditions obtaining on its lines. The railroad equipped the tenders of successive lots of the Class M. Mikados, purchased during the past year and a half, with different types of wheels. There were three lots of these tenders, of 25 each, equipped respectively with unheat-treated carbon steel tired wheels, oil-treated carbon rolled steel wheels and oil-treated chrome-vanadium rolled steel wheels. One of the most serious problems in locomotive maintenance with which this railroad has to contend is the large amount of shelling of wheels and tires during the cold winter months. Under the conditions existing freedom from or the greatest resistance to shelling is possibly the chief gauge of the merits of a wheel.

Comparison was possible under the following unusually equal conditions: There were an equal number of wheels of the various types; the quantity was sufficient to permit of definite conclusions; the wheels were running under practically equal conditions; and, in effect, the period of service was the same; for, though the steel tired wheels were in service longer than the others, they saw little service during the winter of 1913 and the real test of their merits came last winter, which was an unusually severe one.

A summary of the facts disclosed as to the relative resistance to shelling of the three different types of wheels is given in the following table:

Type of wheel	Standard oil-treated vanadium rolled steel wheels	Standard oil-treated carbon rolled steel wheels	Steel-tired wheels
Water capacity of tender, gal.	2,000	9,000	9,000
Weight of tender loaded, lb.	172,100	172,100	172,100
No. pairs wheels in service	100	100	100
Date engines entered service	Oct. to Dec., '13	Aug. to Sept., '13	Jan. to Mar., '13
No. pairs wheels removed account shelling up to May, 1914	3	9	17
Percentage of total shelled	3	9	17
Relative rate of shelling of other makes as compared with oil-treated vanadium rolled steel wheels	1	3	5½

From this it will be seen that only 3 pairs out of 100, or 3 per cent. of the oil-treated chrome-vanadium rolled steel wheels had to be removed on account of shelling. The oil-treated carbon steel wheels shelled 3 times as much and the steel tired wheels 5½ times as much as the oil-treated vanadium rolled steel wheels.

Further comparison showed that of the oil-treated vanadium wheels only 8 pairs or 8 per cent. had to be removed from any and every cause, such as sharp flanges, etc. Of the oil-treated carbon steel wheels 22 pairs or 22 per cent. had been removed; and of the steel tired wheels, 52 pairs or 52 per cent.

In the latter case, the larger number of removals is attributable as far as other causes than shelling is concerned, to their longer service. As regards shelling, however, this circumstance does not affect the comparison with the other two makes. All the cases of shelled steel tired wheels occurred during the past winter, while none shelled during the short period in which they were in service during the winter months of 1913.

As regards wearing qualities, the oil-treated chrome-vanadium rolled steel wheels showed 68 per cent. more mileage per unit of wear than the oil-treated carbon rolled steel wheels. The former have averaged 14,500 miles per 1/32 in. tread wear, not including turning, as compared with 8600 miles, the record of the latter.

The C. W. Raymond Company, manufacturer of clay-working machinery, Dayton, Ohio, has gone into receivers' hands. This is stated to be due to losses occasioned by the flood of 1913 and financial conditions arising from the European war.

Theory and Practice of Sherardizing

What Was Done in a Sherardizing Plant Which Was Not Operating Satisfactorily to Improve Conditions of Men and Product

BY SAMUEL TROOD*

There has been very little written on the theory of sherardizing and almost nothing concerning the practical side. It therefore may be helpful to those about to engage, or already engaged, in this process to know some of the experiences of others in connection with sherardizing. For this reason I will try and give some of my own personal experiences with this process.

Being engaged as a consulting engineer with a large manufacturing company, among other betterment work came the problem of improving the sherardizing department. Consulting their file on sherardizing for five years back, I came to the conclusion that a thorough study of the process was never made, that the company from whom the plant was purchased had no explanation for sherardizing and that even the inventor himself called the process a mystery. I did not believe that a combination of a mystery with shop practice was good, but firmly believed that success in manufacturing was only possible when the shop was well directed and instructed. The question then was, how could this be done in that case?

The plant was installed for the purpose of sherardizing material for their own product. The material included bolts, nuts, malleable iron castings and line material which could not be satisfactorily treated by other methods. When the plant was installed the men in charge of the plant knew practically nothing about the process. Sherardizing was done in the same room with pickling and hot galvanizing. The steam and acid fumes from the large pickling tanks (used for pickling large castings preparatory to painting) not only had a deleterious effect upon the sherardizing process, but also in connection with the zinc dust in the air, made working conditions almost intolerable. Whenever articles were pickled in large quantities they were first placed in an empty acid tank and the acid and water poured over them until covered. When, on inspection, the pickling process was completed, the acid was allowed to run into the sewer. Before all of these pickled articles could be washed off most of them had acquired a thin coating of rust which necessitated another dip in the acid before being sherardized. No unloading pit had been provided, the dust being dumped upon the floor to be trampled under foot and, on several occasions, to be flooded by water. The ovens, too, were not suitable for the work. The clutches which connected the drums with the driving mechanism were crude and clumsy so that they could not be applied from outside. This necessitated cooling of the ovens to allow a workman to enter the oven to attach a clutch.

Considerable trouble had been encountered by the dust caking and balling in the drums. This became so bad at times that nearly a whole drum of work would be scrapped and much dust wasted. This condition was practically eliminated by confining the dust in a bin away from all water or acid vapors, as well as keeping the temperature within the limits for the particular dust used. The large pickling tanks and paint tank were removed from the building, giving more room, improving working conditions considerably and especially reducing the amount of acid fumes coming in contact with the zinc dust.

ELIMINATING BLACK SPOTS ON FINISHED WORK

One of the principal difficulties was the elimination of black spots on the finished work. At times this became very exceessive, not only detracting from the appearance of the work but also reducing the number of dips the material would stand under test. Two principal causes were found for this fault. The first was the presence of "burnt in" slag in the corners or crevices of the material which it was almost impossible to remove by pickling in some instances. This was corrected by more intelligent inspection of the material, both before and after pickling. In connection with inspection, it was found that the material received practically no inspection before treatment. Whenever slaggy material reached the sherardizing department, the inspector was notified and it was often found that the material had been removed from the foundry more than two years before. An entirely new system of inspection has since been adopted, which has taken care of the black spots from this cause.

The second cause was the presence of acid in the spongy or porous parts of a casting which was not thoroughly washed out or neutralized. It was difficult to obtain castings without some porous parts or corners that were filled with fine cracks, but by careful attention to pickling and neutralizing the black spots were reduced to a minimum.

OBVIATING NON-UNIFORMITY OF COATING

Another fault was the non-uniformity of coating even with the same kind of material in the same drum as shown by testing some of the material from different parts of the drum. A heat analysis of the furnaces showed a variation of temperature. This affected the uniformity of coating considerably, notwithstanding the drums were rotated through the run. This fault was corrected by putting new baffles in the furnaces, additional heat insulation on the doors, and new burners, which gave more uniform distribution of heat. New clutches were also included in the general overhauling of the furnaces, which allowed the driving mechanism to be connected to the drums from outside the furnaces.

In order to save the excessive waste of acid eight small pickling tanks were installed, together with sufficient baskets for handling the material. An electric hoist was installed for handling the baskets of material from one tank to another. By this betterment the quality of pickling was improved as well as reducing the amount of supervision required because of systematizing the process. By handling the material in smaller quantities during pickling it was found that better inspection was possible.

Some difficulty was encountered in the case of one particular malleable iron article, or cap, which was swedged on the end of a wooden rod. In this case the sherardizing must be done before the iron

*Consulting engineer, New Castle, Pa. What sherardizing really is, defining the process for the first time in a satisfactory way scientifically, was described by Dr. Trood, in *The Iron Age* of July 23. In the second article, in *The Iron Age* for July 30, he discussed practical points in operating a sherardizing plant. In the issue for August 6 he described and illustrated a typical sherardizing plant. In the last issue he discussed methods of testing coatings.

cap was formed on the rod. Whenever the sherardizing was heavy this forming process would cause the cracking or peeling of the coating. By increasing the temperature and decreasing the time of the process (using blue dust) the quality of the coating was much improved. In this way the sherardized articles would stand the same number of dips test with a much thinner coating and would retain their coating through the forming process.

IMPROVING PSYCHOLOGICAL CONDITION OF MEN

In this connection the improvement in the psychological condition of the men cannot be overlooked. Under the adverse conditions the men, including those in charge, were very skeptical of the process. By explaining the process to them and investigating each part of the process with their cooperation it was found that much could be accomplished. This was done by improving the unbearable working conditions, as well as those having a direct bearing upon the process. Since these improvements were made, this plant has been doing as good work as any others, while still further improvements would probably increase the convenience and lessen the cost of the process. This is an example of what has been done in one case to improve a plant and may be a means of helping others to overcome their difficulties, who have had the same or similar conditions to contend with.

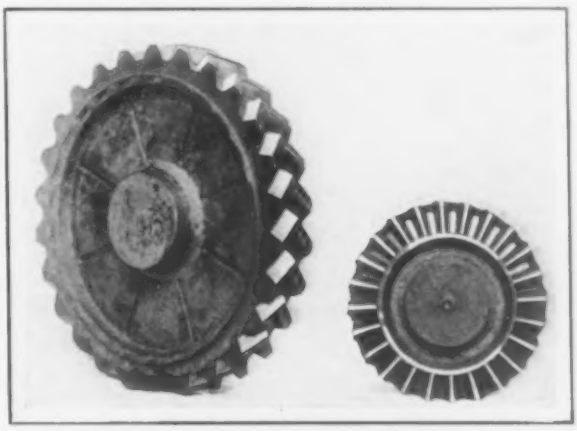
At one time I was asked concerning the relative merits of hot galvanizing and sherardizing. My answer to this was that a choice between hot galvanizing and sherardizing depended upon a choice between skilled labor on the one hand and engineering intelligence on the other.

(*The End*)

Hot Rolled Helical and Bevel Gears

Some time ago a gear rolling machine for forming the teeth on spur gear blanks was invented by Harold M. Anderson, and for over a year the Anderson Rolled Gear Forging Company, Cleveland, Ohio, of which Mr. Anderson is president, has been producing rolled spur gears for the trade. The machine employed was illustrated in *The Iron Age*, April 10, 1913, and different types of machines using the same process have been designed for rolling double helical and bevel gears, it being claimed that gears of these types can be made as successfully by the rolling process as the spur gears. Among the advantages claimed for the rolled gears in addition to a lower cost are that they are much stronger than machine cut gears, the metal in the teeth is denser because in rolling the teeth each one is practically forged by a powerful side pressure and there is freedom from scale.

In making the small helical gears the ordinary procedure is to cut the teeth on two sections which are then bolted together. This, however, is expensive and it is expected with the gear rolling process that since the double helical gears can be produced so much cheaper than by the ordinary machine cutting process there will be a considerable demand for them to take the place of spur gears where they are considered preferable to the latter, but where spur gears are now used on account of their comparative cheapness. Other places in which it is expected these gears will be used are in the construction of heavy automobile trucks, which have individual clutches and in street cars. Like the rolled spur gear blanks the double helical and bevel gears are made by rolling the hot gear blank against a die, the blank being forced into contact with the die roll until the proper depth of tooth is reached, as well as the desired diameter of the gear. The entire operation is automatic and it is simply necessary for the operator to feed the blanks into the machine, where they are held between two chucks during the rolling operation. It is stated that a double helical, bevel or spiral bevel gear can be rolled as easily as a spur gear. The rolling process eliminates the operation of turning the edge and after leaving the machine all that is necessary to be done to finish the gear is to trim out the flash and bore and face the hub.



Specimens of Double Helical and Bevel Gears Produced by the Hot Rolling Process in a Recently Developed Machine

In the accompanying illustration one of each type of gears is shown after being rolled and before the finishing operation. When this has been done, the finished teeth are true and the sides have sharp edges. In a recent test a steel casting was used as a gear blank and this was rolled successfully, although the rolled gear had a somewhat rough appearance. The machines have a capacity for double helical gears up to a pitch diameter of 3½ in., small bevel gears up to a maximum pitch diameter of 6 in. and spur gears ranging from 3½ to 12 in. on the pitch diameter. Three double helical and four small bevel gears can be rolled on the machine in 1 min.

A physical test was made of a machine cut and a hot rolled gear, both having a pitch diameter of 6 in., and it was found that the hot rolled gear before case hardening had a yield point of 7918 lb., or 22.6 per cent. higher than the machine cut gear which had a yield point of 6470 lb. The hardness as measured by a scleroscope gave results of 26 and 22 respectively. When the gears were case hardened it was found that the hot rolled gear had a yield point 9 per cent. higher than the machine cut gear. A set of photomicrographs was taken and confirmed the results of the physical test.

Duty on Tube-Welding Machines

The Board of General Appraisers of New York has decided adversely to a claim by the Davis-Bournonville Company that tube-welding machines were entitled to enter this country at a duty of 30 per cent. ad valorem under the tariff of 1909 as machine tools. The collector had classified the articles as manufactures of metal dutiable at 45 per cent. The board decided that the machines do not employ a metal-cutting tool and therefore are not entitled to classification as machine tools.

The manufacture of gas mantles is a business which has been directly affected by the European war. Thorium, which is essential in manufacturing the lighting surface of the mantle, is almost wholly manufactured in Germany and it is impossible at present to secure a supply of this material.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,

The Schoop Process of Metal Spraying

A Pistol Used Into Which the Metals Are Fed as Wire—Theory of the Process and Its Applications in Coating, Decorating and Copying in Metal

The Schoop metal spray process of protecting or decorating materials of all descriptions has been in successful commercial use in Europe for several years. It will now be introduced in the United States by the Metals Coating Company of America, Peoples Gas Building, Chicago, which has acquired the American rights of Schoop and other European inventors and already had the basic patent which controls impacting of metals irrespective of the nature of the apparatus used. It thus can utilize

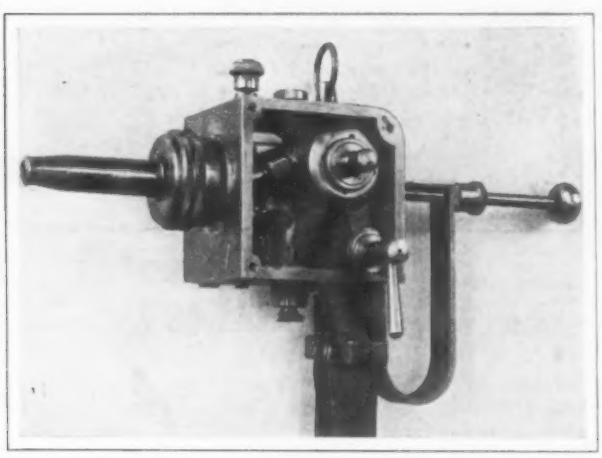


Fig. 1—The Pistol Used in Spraying Metal to Cover Surfaces of Materials under the Schoop Process

in metal spraying a group of inventions, no one of which would suffice for the present stage of the commercial development the process has attained.

The mechanism of the "pistol" by means of which the metal spray is applied is simple and the weight is small. The flexibility of the range of operation is limited only by the length of connections with the compressed air supply and with tanks of oxygen and hydrogen. Therefore, it can be used in covering such large bodies as steel structures with a permanent preservative. The possibilities of the apparatus are indicated by the statement that a protective coating of lead can be applied for 2c. or less per square foot of surface. The pistol as used in Europe has been much improved by the American owners of the patent rights.

Elemental and alloyed metals are handled with equal facility. Lead, tin, zinc, aluminum, copper, brass, bronze, German silver, and the more precious metals are deposited in a coating from 0.001 in. upward in thickness. The materials which may be treated in this manner include metals, wood, paper, stone, clay, cement, cotton, woolen and silk fabrics, and glass. Whatever the surface, the spray quickly coats it with a dense adherent film of the metal which, in the form of wire, is fed into the pistol. Under a magnifying glass the metal is seen to be distributed with exact evenness. It takes a burnish even when deposited on ordinary paper. The only preliminary preparation of the surface is the removal in a sand blast of paint or varnish or anything else which may fill the pores.

CONSTRUCTION OF THE SPRAYING PISTOL

A study of the application of the process under commercial conditions reveals the almost revolutionary nature of the invention. The pistol is shown in the illustrations. It weighs only 3½ lb. The cold wire is pulled from a reel into one end of the 3-in. cubical box, continuously and uniformly, at the rate of about 12 ft. a minute, while at the mouth of the short nozzle at the opposite end there issues a continuous hot blast that carries entrained in it, with a velocity of about 3000 ft. a second, a very fine spray of molten metal.

The mechanism within the box consists of an air-driven feeding and wire-straightening device which leads the metal into the nozzle core. The wire remains cold and unaltered until it is about ⅛ in. from the nozzle, at which point it undergoes the transformation into spray. The nozzle is directed at the surface which it is proposed to cover from a distance of only 5 or 6 in. The temperature of the molten metal spray at the nozzle varies according to the wire used, from 700 to 2000 deg. F., yet at this trivial distance none of the materials that have been mentioned are injured or altered in the act of being metallized. Matches held in the zinc spray are immediately coated over without ignition, and the thinnest paper and wood received the impacting particles into their pores without charring. Brass issuing at 1550 deg. F. is deposited on thin silken fabric without injury to the textile.

The mechanical details of the metal spraying pistol are shown in Fig. 1, in which one side plate has been removed from the box, and in Fig. 2, in which the mechanism is seen in plan and section. Three hose pipes lead oxygen, hydrogen and air from their respective containers to the burner tube and blast nozzle, which are concentric. Provision is made for convenient control of the gases.

The feed apparatus consists of a turbine, operated by the air independently of the blast, which drives friction wheels. A cone of gears permits of any desired regulation of feed. The wire is fed down the core of the inner burner piece at the end of which it passes into the flame zone created by

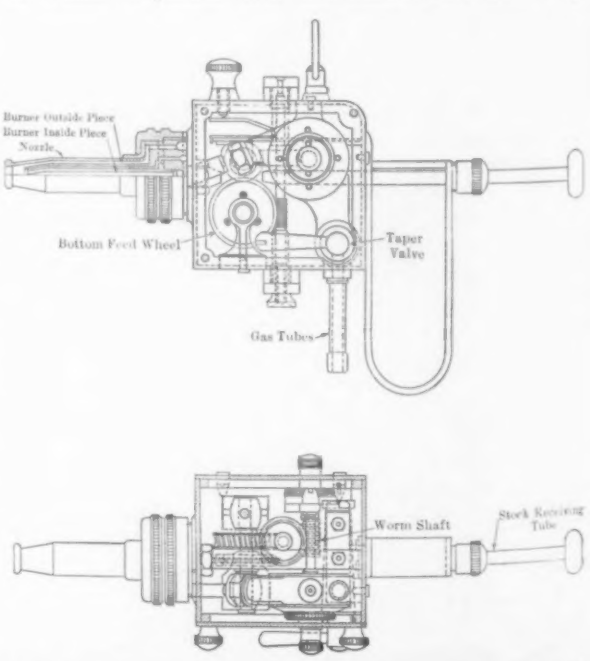


Fig. 2—The Details of the Mechanism of the Improved Schoop Metal Spraying Pistol

the ignition of the mixture of hydrogen and oxygen, which gases pass simultaneously between the two burner pieces. Immediately in front of the flame zone the nozzle discharges a powerful blast of air which completes the disintegration of the wire and causes its particles to be entrained in the expanding gas and air. A supply of compressed air and tanks of commercial oxygen and hydrogen having reducing valves are the only requisites in operating the pistol with any metal in the form of wire. Where lead is sprayed the pistol handles a wire 3 mm. in diameter, distributing 1 lb. of metal per minute. With all other metals the wire used has a diameter of 0.8 mm. Fig. 3 shows the pistol in use, converting a cement statue into a bronze figure.

Fig. 3—The Process of Converting a Cement Figure into a Bronze Statue with a Schoop Pistol

THEORY OF THE PROCESS

In considering what occurs in the Schoop process it is necessary to bear in mind the singular fact that the sprayed metal moves only five or six inches between its point of fusion and the object to be coated, and yet does not reach the object in a molten state. It even possesses so low a temperature that it can be safely directed for a moment upon the hand without injury and can be continuously impacted upon materials such as cloth, paper, wood and even celluloid, any one of which would be consumed by the heat of a molten metal.

The theory is that the gaseous medium used is much larger in volume at any moment than the drop it has pulverized and is carrying, and the gas is expanding so rapidly that its temperature is far lower than that of the spray. A rapid exchange of heat therefore takes place between them, which consolidates the molten particles and gives them a temperature far below the melting point. If the particles arrived at the base in a liquid state with the velocity of 3000 ft. a second they would simply splash on the plate and most of them would rebound. As a matter of fact they impact and interpenetrate freely, and the later bombarding particles unite with the earlier ones to form homogeneous compact bodies. It is supposed that the cooled particles of metal just before impinging with great velocity on a hard surface are in an abnormal physical condition. Due to the heat of collision they pass directly into a vapor which condenses and solidifies on the relatively cold receiving body, penetrating by osmotic pressure the superficial pores of the base where any affinity for the latter exists; otherwise, they are driven in by the pressure behind them.

In either case the metal condenses and solidifies after penetration and is effectively dovetailed into the base. The hammering and bombardment of the solidified first coat by the minute succeeding particles is practically a process of cold working. The entrained particles liquefy and solidify so rapidly that the metal has not time to return to its natural crystalline state. The theory seems to be supported by examinations of the sprayed deposits; for the structure of the metal coatings and of the whole bodies produced by the process is found to be amorphous and vitreous throughout.

APPLICATIONS AND COSTS

The process has been applied in many directions. Unlike other existing processes, there is no need to subject the whole of an object or structure to the coating. Any part, however small, can be metallized alone with any one of a dozen metals. Three main lines of application have been developed so far:

1. To preserve from decay in the atmosphere or from moisture or any form of chemical action objects of any coherent substance, including wood, paper, stone, cement, etc., and particularly objects and structures of the essential but vulnerable metals, cast iron and steel, in every variety of their use in the arts.

2. To decorate all or part of an object of any metal or of any coherent substance.

3. To copy in metal, by means of the detachable sprayed coatings obtainable with the pistol, any metallic, cement or composition object.

The possibilities of the process appeal strongly to the imagination. Any permanent preservative against the atmosphere is of inestimable value, especially with large structural work. To be able to treat iron and steel so that they are not subject to the action of acids and other chemical substances should work a large saving in cost. Wood and other inflammable materials are fire-proofed. For example, a match thus coated with zinc cannot be ignited even when held in a flame. Wooden patterns now duplicated in metal form for extensive foundry uses are preserved in wood indefinitely by spraying with the desired metal. For marine purposes an application of the process should be of large importance. In the electrical industry the possibilities are great. For instance, carbon is coated instantly with copper. Resistance laminæ of any thickness can be deposited on any metal or substance. Commutators can be rapidly built up of any shape and the resulting copper or metal used is of a density and uniformity of quality that adapts it for electrical purposes. The possibilities in galvanizing will be easily recognized.

The cost of operating the Schoop process in the United States has been carefully ascertained through experience with the appliance in the last six months. The seven metals most commonly used for protecting or decorating surfaces are lead, zinc,

aluminum, brass, German silver, bronze and copper. When the gases are purchased in small quantities in the usual containers, the cost of spraying lead, including the cost of wire, compressed air and labor, is between 1c. and 2c. a square foot, the other metal coatings varying with the initial price of raw material and its relative hardness. Where concerns operate a number of pistols they usually generate their own gases or purchase them on a wholesale basis, thereby effecting a considerable saving.

DEVELOPMENT OF THE APPARATUS

The first practical apparatus disclosing and using the principle of the Schoop invention involved the use of a large reservoir of molten metal, the liquid drops of which are pulverized, or atomized, by pressure, and simultaneously projected with great velocity so as to adhere to a base. This apparatus lacked portability for commercial purposes and is practically restricted to spraying lead and tin, which it does successfully.

In the next form of apparatus carrying out the principle of the invention, the large reservoir of molten metal is replaced by a container of manufactured metallic dust resembling in arrangement a small sand-blast outfit, the dust being simultaneously acted upon by heat and pressure and successfully projected and impacted upon a base. This "cyclone" apparatus is still employed for special purposes, but the high cost of metallic dusts and their liability to oxidize rapidly has restricted its use chiefly to zinc.

The next step was to create from solid metal a succession of minute drops and instantly to pulverize or atomize and project them under the simultaneous action of heat and pressure. This form of the apparatus attained the desired end and has been used as a spraying pistol for some time in Europe, though in its latest improved form it was only introduced into this country six months ago. As a result of the efforts of inventors, the original apparatus weighing over a ton has been reduced to a compact portable hand instrument weighing only 3½ lb.

PRESENT STATE OF THE COATING ART

Despite a rapid advance during the past decade in knowledge of the internal structure and characteristics of metals in all physical states and a general desire for the conservation of mineral resources, the art of preservation has lagged behind, and the steel and iron structures of the engineer and manufacturer remain to a very large extent a prey to corrosion.

The electro-plating bath, while coating more or less successfully a large amount of metallic hardware with nickel, copper, silver or gold, greatly limits the size of the articles handled. It exposes steel and iron to moisture and chemicals and does not deposit the commoner metals. The stable metals have long been desired in the form of thin adherent protective coatings not only on other metals but also on many coherent substances used in the arts, such as wood, paper, leather, glass, stone, cement and textiles, but no practical solution of the problem has been furnished through electrical deposition.

The electrical fusion of copper dust sprinkled over non-conducting surfaces has been accomplished, but only for decorative purposes, and it is an expensive process. Two other processes dealing with a single metal, zinc, occupy the field today. A large quantity of iron and steel receives a temporary coating of zinc by the wet galvanizing process and a smaller quantity is more effectively coated by the dry galvanizing method known as sherardizing conducted at high temperature. The various chemical processes for obtaining finishes need not be considered here.

For the protection of structures and apparatus in general the engineer and manufacturer have still to rely mainly upon the temporary arrest of decay afforded by paints, enamels and their substitutes and this steel age presents no more serious practical problem than the effective prevention of the decay which awaits our most essential structural metals.

Designing Chart for Structural Engineers

Charles W. Schubert, 1357 East 110th street, Cleveland, Ohio, has developed a designing chart for steel and wood beams. It is intended to give the permissible uniform load and load per lineal foot for any span, the spacing of the beams to support any of the usual floor loads, maximum bending moment, etc. The chart is of the graphical variety with sets of graduations for the various variables and the different kinds of beams that are in ordinary use.

In using the chart a line is drawn through the graduations corresponding to the given information and where this line cuts the other set of graduations will be found the answer. For example, if it is desired to find the size of beam to carry a total uniformly distributed load on a certain span, a line is drawn through the graduation corresponding to the given span and the total load, and the point of intersection of this line with bending moment graduations is noted. A horizontal line drawn through this point of intersection will pass through the list of beams given and the one that is entirely above this line and most nearly approaches it is the one that should be used. To determine the placing of this size of beam for a given load per square foot of floor, a second oblique line is drawn, the points through which it passes being the required load per square foot and the point at which the first oblique line intersects the set of graduations corresponding to the load per lineal foot of the beam. This second line is drawn to the left until it intersects the set of graduations corresponding to the span in feet, and this point of intersection gives the distance from center to center of the beams. For use in connection with the design of wood beams the problem is solved in practically the same way, the dimensions of wood beams being given by the graduations also.

A legal term rarely used has come into much prominence the past two weeks in connection with European affairs. Because of dislocated financial conditions precipitated by the war, several European governments have declared a "moratorium" to apply to the current month. According to banking authorities, this means that the payment of no debt in the country affected is enforceable at court during the period of suspension, regardless of whether in individual cases the debtor was able at the time to meet his obligation or not. Any one may, if he can and desires to, pay his debt on time. The moratorium is merely designed to save from failure houses that are temporarily embarrassed because of their inability to collect on their credits as a result of the abnormal conditions and the general dislocation of trade relations.

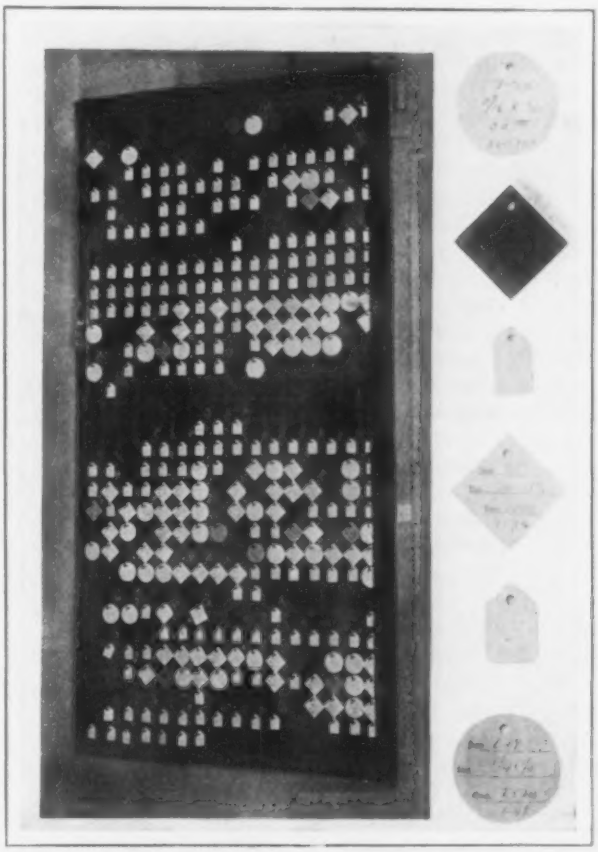
The Longmead Iron Company's property at Conshohocken, Pa., comprising rolling mill buildings and 22 acres of ground, has been sold to Emery P. Day, a real estate broker, whose offices are in the Penn Square Building, Philadelphia, Pa. The mill has not been in operation for several years. The purchaser intends to utilize a portion of the property for the operation of a cement-working industry and the remainder will be divided into plots suitable for other manufacturers.

The United States Oxygen Corporation was incorrectly located in the issue of *The Iron Age* of August 6. This corporation has its executive offices at 120 Franklin street, Boston, Mass., and its New York branch is at 50 Church street.

Keeping Track of Stock in a Factory

Board and Tags Used by National-Acme Mfg. Company to Show What Products Are Going Through the Plant on Screw Machines

In a manufacturing plant where there is a large production of many kinds of small parts for stock it is very desirable for the stockkeeper to know what goods are going through the factory in the process of manufacture. Having this information always on hand enables the stockkeeper to check up rush orders stock which is not on hand in the finished stockroom, and it also makes it possible for him to make delivery promises on goods that are out of stock as he can tell without a waste of time when the products wanted were started through the factory. Having this information he will know from experience when the goods will be finished and ready for shipment. A simple plan for keeping track of orders for standard cap and set screws and special parts that are being made on its automatic screw machines has been used by the National-Acme Mfg. Company, Cleveland, Ohio, for more than a year and has proved very satisfactory. The need of some system for this purpose might not be felt in a small plant, but it is found almost indispensable in a factory the size of that of this company where the normal daily output is over 1,000,000 pieces in standard and special parts, and where 10,000 different specialties are made on screw machines in the course of a year.



The Board and Tags Used to Keep Track of the Different Screw Machine Products and Specialties Being Turned Out by the National-Acme Mfg. Company

The plan first adopted was to have each foreman report to the stockroom the sizes and styles of screws on which machines under his direction were starting. As these reports came in the stockkeeper checked them on a board which was marked off into squares, each square corresponding to a certain machine. This plan was found to be inadequate, because when one job was completed on a machine and another one followed it, it was necessary to erase the first record before entering the second. To operate this plan effectively it would have been necessary to make copies of the records on the board before substituting others for them. Frequently a lot of screws would be lost track of between the time they were completed on an automatic machine and the time they came through to the stockroom.

The plan that was adopted and is now in use employs a board which is marked off into squares with a small hook screwed into each square. The sizes of machines are shown in large figures on the left-hand margin, one of the numbers on the margin showing the sizes of all the machines in that row and the machines listed on the horizontal rows under it down to the next row that has a number in the margin on the left. Each square represents an automatic machine and is numbered to correspond to the number of the machine which it represents.

On these hooks are hung small tags of various sizes, shapes and colors to represent the different classes of stock goods. There are eight colors representing eight distinct classes of goods, and two shapes for stock goods, square and round. The square tags shown at the right usually represent standard styles of screws with the United States standard threads, while the round tags of the same color designate a screw of the same general type but with a V thread. These different colors and shapes cover all classes of standard screws, nuts, etc., carried in stock. In addition small irregular shape tags are used to represent special goods and to designate that the machine represented by the square in which the irregular shape tag is hung is running on special goods and cannot be counted on for stock goods.

When a job is started on an automatic machine a tag of the correct color and shape to designate the class of screw is selected. On this tag is entered a record of the size and quantity, the date when the job is started through and the serial number of the machine on which the job is running. Then this tag is hung on the proper hook on the board in the storekeeper's room. In case the tag should be laid aside instead of being at once hung in its proper place, identification can be made later by its color and shape and the record on it, and the tag can be hung on the hook where it belongs.

When one job is completed on an automatic machine and goes to the raw stockroom for finishing, polishing, etc., another job usually immediately follows it on the machine. When the new job is reported to the stockroom the tag representing the preceding job is removed from the board and filed in a compartment in a sectional drawer for future reference. When the job passes through the finishing room and reaches the finished stockroom ready for shipment, the tag representing it is taken from its compartment in the sectional drawer and is destroyed.

When a certain stock runs low the stockkeeper gives a requisition for additional stock to the superintendent of the products division and he has an order made out through the order department for the desired number of parts to replenish the stock. This order goes to the factory office where the production of the parts is assigned to an idle machine. The order then goes back to the storekeeper, who writes on a tag the record of the size and quantity of the order and the date its production was started and hangs the tag on the square of the board with the number corresponding to that of the machine on which the job is being done. In this way the stockkeeper can tell by glacing at the board what goods are in the process of manufacture and from this information he can tell very accurately as to when he will have some of the goods for shipment.

NEW YORK MARRIED WORKMEN

Workmen's Compensation Commission Exceeds Its Powers—Act Needs Amending

BY FRANK A. GAYNOR*

A question would seem to arise as to the authority assumed to be exercised by the Workmen's Compensation Commission of the State of New York in respect of a recent complaint made to it by certain labor organizations. The complaint, in substance, was that, since the workmen's compensation act of New York went into effect, on July 1 last, some employers of labor had discharged and refused employment to married men and thereby indicated a policy to discriminate against having in their employment married men. The asserted reason for such conduct on the part of the employers is, that liability under the New York workmen's compensation act is less in amount in respect of an unmarried workman than of a married workman. In other words, the operation of the New York Act has resulted in discrimination against married men, if the labor organization complaint is good. If injustice to married men is an effect of the Act, obviously the Act should be amended. No such effect has resulted from the operation of Acts of which the English and Massachusetts Acts are typical. The commission responded to this complaint by resolutions passing an unfavorable sentence upon such employers. Here's one resolution:

> This commission feels that upon legal, practical and moral grounds it is warranted in insisting that industry shall respect the family life of the citizens of this State, and it intends to use all the power legally vested in it to protect married men, with or without families, in their right to work and enjoy the protection and benefits of the workmen's compensation act. To that end it was further
>
> Resolved that an investigation be instituted into the charge that employers of labor carrying their own insurance and employers insured in stock or mutual companies have discriminated or are discriminating against married men with families, in order that this commission may be in possession of the facts and in a position to reconsider its action in granting to employers who have thus abused it permission to carry their own insurance, and such other action on the entire matter as may be deemed necessary in the premises.

These resolutions and the procedure leading up to the passing of the resolutions point directly to a tendency on the part of the commission of New York to feel that it has authority to pass upon the act of an employer in refusing to employ or to retain in its employment married men.

THE COMMISSION'S POWERS DEFINED BY THE STATUTE

By the workmen's compensation act, very extensive powers are conferred on the Workmen's Compensation Commission—powers which may be exercised for the benefit of the public and the workmen, but which may also be exercised to the great detriment of those carrying on the industrial business of New York State—and therefore the commission should be most cautious before it assumes jurisdiction of an inquiry of the character of the one started by the labor organizations to ascertain, in the first place, whether or not it has the authority to listen to such an inquiry.

The commission is purely a creature of statute, of the workmen's compensation act, and has only the authority granted by that act. For every action which it takes the commission should be able to place its finger on some word or words in the act which point to an intent on the part of the Legislature to clothe the commission with the authority to take such action. If such an intent cannot reasonably be found in the act, then it is fair to assume that the commission has not the authority to take the action.

A glance at the New York workmen's compensation act will convince that there was no intent on the part of the Legislature to clothe the commission with authority to listen to a complaint of the character of that made by the labor organizations, much less to make a decision thereon such as that embodied in the resolutions above referred to. The entire proceeding was outside of the sphere of action granted to the commission by the act.

THE COMMISSION IS ONLY A JUDICIAL BODY

The various provisions of the act show that the proceedings before the commission involve and embody the features and earmarks of judicial procedure and action. For example, the act provides for an appeal to the Appellate Division of the Supreme Court of the State of New York from every decision or award of the commission. Then there is a provision in the act for the issuance of subpœnas, for punishment by the commission for contempt, for the taking of depositions and for the enforcement of its awards and decisions. Everything in the act tends to show that the Legislature intended to clothe the commission with functions resembling those exercised by a trial court or referee and those exercised by an arbitrator under the English workmen's compensation act.

Large as its powers are, they are no greater in extent than those exercised by a court. Yet no one would seriously claim that a court would possess any such jurisdiction as that assumed to be exercised by the commission in respect of the complaints of the labor organizations. Much less is there any authority in the words of the New York act for the exercise of such a power. The result of the commission's actions is that it has jurisdiction over a proceeding brought by workmen, ex parte, that is to say, without hearing a single employer, to determine (1) the fact whether or not employers have, in employing men, discriminated against married men, and (2) that the act of discriminating is unlawful. It will be seen that such a power is unparalleled in its vague extent.

COMMISSION HAS NO POWER TO TAKE THIS ACTION

It is confidently asserted that the commission possess no such power. The purposes of the act, so far as the question discussed in this article is concerned, for which the commission may exact any testimony embrace only a claim for compensation under the act and the question whether or not an application made to it by an employer to carry his own insurance should be granted. It has no power to investigate in respect of any claim or application that has not been presented to it for review.

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The injustice of the present situation is apparent. In the first place, the power to pass judgment on a person is limited, as it usually is in English-speaking countries at least, to cases where that person has been given an opportunity to be heard on the facts. In the second place, an appeal usually lies from every determination of a trial court or a referee. The New York act expressly allows an appeal from every award or decision of the commission. Yet the action of the commission in respect of the complaint made by the labor organization has resulted in a situation where the employers were not given a chance to be heard and in a decision in form of resolution from which no appeal can be taken.

It is hard to believe that anyone would seriously present a complaint like that of the labor organization to a trial court or to the Appellate Division of the Supreme Court. And if one were presented there is little doubt as to the disposition which either of those tribunals would make of it. Yet the Appellate Division's power in respect of what can be lawfully done under the act is greater in most respects than that of the commission. That court may review every award or decision made by the commission. It is not believed on the strength of other than explicit and unmistakable words in the act that such autocratic power lies in the commission.

TEST OF EMPLOYER'S RIGHT TO CARRY HIS INSURANCE

The view of the commission that discrimination by an employer against married men should militate against the employer, in the commission's determination of the question whether an employer should be allowed to carry his own insurance, is not at all acute. By a resolution, the commission said:

> As a matter of fact, the cost of insurance under the workmen's compensation act is exactly the same to the employer, whether married or unmarried men are employed, and employers who have been granted permission to carry their own insurance are making a fundamental mistake when they discriminate against married men.

These words clearly express a belief in the commission's mind that the fact of discrimination should weigh heavily against an employer in any proceeding before it, and especially in the commission's determination of the question whether an employer should be allowed to carry his own insurance. The belief is highly erroneous. The fact of discrimination, if relevant at all in a proceeding to determine whether or not an employer should be allowed to carry his own insurance, would be admissible only as proof in favor of an employer who so discriminates. And for this reason:

The sole test of the right of an employer to carry his own insurance is his financial ability to pay compensation in respect of an injury to or death of a workman. Obviously, his financial ability is not less because of the employment of unmarried men. It is greater.

Here's what the act says about the right of an employer to carry his own insurance:

> An employer shall secure compensation to his employees in one of the following ways: . . . . .
> By furnishing satisfactory proof to the commission of his financial ability to pay such compensation. . . . .

The asserted policy of the employers who, it is said, discriminate is that a larger financial ability to pay compensation is required in respect of married men than of unmarried men. How then can the commission lawfully consider the fact of such a discrimination in the light of evidence of lack of financial ability to compensate workmen?

HOW TO AVOID INJUSTICE TO MARRIED MEN

There is, indeed, grave doubt as to whether the Legislature, with its wide powers, could lawfully enact a statute which would destroy an employer's right to employ only unmarried men. It might find a constitutional obstruction to any such statute.

However, it strikes the mind at once that an injustice is done to married men if they are discriminated against because of the operation of the New York compensation act. And the serious question arises as to how the injustice may be avoided. It would seem to be well to remove the cause which results in the injustice. The cause, it is believed, lies chiefly in the nature of the section of the New York act which provides compensation for the death of a workman. The section is altogether different from the corresponding sections not only of the English act, the act which is followed by the acts of other foreign countries and of other States of the United States, but also of the New Jersey, Connecticut, and Massachusetts acts. Under the latter acts, so far as investigation has disclosed, no such difficulty as that presented by the labor organizations has been encountered. So that the difficulty may be due to the nature of the New York act. Nor is the section of the New York act in line with the theory behind a workmen's compensation law.

A workmen's compensation law is not intended to constitute any general obligation on the part of an employer to pay a sum of money in respect of the death of a workman arising in his employer's service. Such laws are only intended to secure to those who are dependent on the workman's earnings compensation for pecuniary loss which they might sustain by being deprived of support which they had received from their deceased relative. It was felt that it was not fair, either to a workman's dependants in case of death or to society, that they should be thrown on society for support. It was much fairer to treat as a part of the cost of production the sum necessary to compensate a workman's true dependants after his death; bnt not to benefit persons who had no connection at all, in so far as support was concerned, with the workman.

COMPENSATION ELSEWHERE ALLOWED TO DEPENDENTS

With this thought in mind the legislators of New Jersey, Connecticut, Massachusetts and England enacted a statute to the effect that, in the case of the death of a workman, compensation should be allowed to all those members of the workman's family who were dependent on him for support.

Under such a statute it is not enough for one claiming compensation in respect of the death of a workman to prove that he or she is a member of the deceased workman's family nor that a legal obligation to support the claimant was owed by the deceased workman. A claimant is bound to go a step further and show that he or she was dependent for support on the deceased workman. In other words, the money awarded to a claimant is in no sense a present in consideration of a relationship to a deceased workman. It is treated as a payment by a third person, an employer, to compensate one as a dependent for the actual pecuniary loss by reason of the severing of the relation, and where death does not involve any real detriment to a pecuniary position the claimant is not allowed compensation. Under these acts, the legal obligations of a husband to support his wife, of a parent to support his child, and of a child to support his parent is not taken at its theoretic value but at its practical value. In England the compensation allowed by the act is intended, to use the words of the present Lord Chief Justice of England when arguing a case before the Privy Council of the House of Lords, "for the loss of a breadwinner."

Under that act—and doubtless the same interpretation will be given to the corresponding sections of the New Jersey, Connecticut and Massachusetts acts—dependency may exist without a legal obligation to support, as for instance in the case where a father was actually dependent on his son for support. On the other hand, there may be a legal obligation to support without the existence of dependency, as for instance in the case of a woman who deserted her husband, or who has ample means of her own.

THE ACT UNJUST TO DEPENDENTS AND EMPLOYERS

The corresponding section of the New York act is altogether different. It takes the obligation to support at its theoretic and not at its practical value. It provides briefly, in the case of the death of a workman, for compensation to a surviving wife or dependent husband and children of a deceased workman without regard to the question whether or not the survivors were dependent for support on the deceased person. Under this act, a woman who had deserted her husband and was living in illicit relation with another man at the time of her husband's death, would be entitled to compensation. A woman of independent means, who neither received nor expected to receive anything from her deceased husband, could receive compensation. Also in the case of children who had independent means and never had received anything by way of support from their parent,—the New York act provides for compensation to them. But it is startling to observe the lack of attention in the New York act to a father whose only means of support was cut off by the death of a child, or to a brother whose support by another brother has been cut off by the death of the latter.

The act in respect of compensation for the death of a workman, according to the well accepted theory of workmen's compensation laws, works an injustice not only to workmen but also to employers. This feature of the act should be amended so as to conform to the theory of workmen's compensation laws. And it is fair to assume that if it is so amended as to resemble the corresponding feature of the New Jersey, Connecticut, Massachusetts and English acts, under the operation of which little, if any, difficulty on the score of discriminating against married men has arisen, there will be no such difficulty under the New York act as amended.

The Workmen's Compensation Commission, it is believed, has no present power to remedy the evil, if any exists, arising out of a discrimination in the selection of workmen. And it is extremely doubtful whether the Legislature has the power to remedy it in any manner other than that suggested above.

Panama Canal Opened August 15

The first steamship to pass through the Panama Canal was the Cristobal, which made an experimental voyage August 3 and 4. The trip was made from the Atlantic to the Pacific in 11½ hours and the return trip in 8½ hours. The locks were found in perfect working order and the canal was formally opened for general use August 15. The steamship Ancon, owned by the United States War Department and leased to the Panama Railroad for service between New York and Colon, with many notable people on board, then made the official passage which signalized the opening of the canal for general use. She left Cristobal at 7 o'clock in the morning and reached Balboa, at the Pacific end, at 4 o'clock in the afternoon, having navigated the waterway in 9 hours. The passage through the Gatun locks was made in 70 minutes. The Ancon was fully loaded, the cargo that she had brought from New York having been purposely left on board to give the canal a test with the ship drawing its full depth of water.

MASSACHUSETTS COMPENSATION

Lessons of the First Year's Operations of Workmen's Insurance

Owners and managers of industrial and manufacturing plants, particularly in the metal industries, will find much that concerns them in the report just issued on the first year's operations under the Massachusetts compensation law. It is evident that such laws will in the near future cover practically all the nation's manufacturing plants; and managers, whether they are now within or without compensation States, may be wise to begin reducing at once the possibility of liability to their employees. The Massachusetts experience, being that of an Eastern manufacturing State, is particularly noteworthy.

THREE ESPECIALLY INTERESTING POINTS

Three main points are presented by the report that are of especial interest to managers. First, and most serious from some points of view, is that the Accident Board which administers the Massachusetts law, is disturbed, and says so, at the early evidence of malingering—nursing of injuries and disability for work—by men who would rather draw half pay for idleness than full pay for work. The board says that this tendency is certain to become serious as the operation of the law continues, and that some means must be provided for forcing back to their duties injured workmen who are disposed to "work" the law for all it is worth. As an indication of the kind of difficulties that are likely to attend compensation laws, it is worth noting that the Massachusetts Legislature, at the last session, failed to give the Accident Board these desired powers to stop malingering, but did increase the compensation of injured employees from 50 per cent. to 66 2/3 per cent. of the average weekly wages. This item shows that the anticipated danger of playing politics with compensation laws is not imaginary.

A second main point is the importance of systematic accident prevention work by employers, as a sort of self-insurance to reduce their possible liability to employees, whether they are under State compensation laws or under ordinary liability insurance. The third main item consists of the statistical presentation of the various causes of accidents to workmen and the number and character of injuries due to the several causes. This statistical matter may serve as a guide in accident prevention work, by showing where the greatest dangers lie.

ANALYSIS OF ACCIDENTS REPORTED

The report covers the period from July 1, 1912, when the law went into effect, to June 30, 1913. During this period, among about 600,000 employees estimated to be insured under the act, there were 89,694 non-fatal accidents. Of the 474 fatal accidents reported, 290 of the victims were insured. In the total of 474 deaths, 119 were caused by "railroad equipment," this term covering all causes of death in railroad operation.

Seventy-six per cent. of the non-fatal injuries were relatively slight, and in this proportion of the total number no compensation was paid, as the duration of disability was under two weeks. Of this 76 per cent., 41 per cent. were injuries disabling the worker for one day or less. This leaves 24 per cent. of the total in non-fatal injuries entitled to compensation. Foundry and metal workers furnished the third highest percentage of in-

jured to the total average number employed, 18.2 per cent. of these workers being injured. Electrical supplies show a percentage of 20.2 injured, while automobile factories come first with 21.3 per cent. Thirty-three per cent. of all the non-fatal accidents were caused by "hand labor," a term which appears to cover everything that does not easily come under special and sharply defined causes. Twelve per cent. were caused by machinery peculiar to special industries, and in this group there are many accidents which resulted in more or less serious and permanent maiming and disablement of the employee. Nine per cent. were the result of "falls" of various sorts—from the mere tumble in getting down from a stool, on which the employee had been seated while eating his lunch, to slipping on the floor in front of a planer and getting a hand torn in the machine. A considerable number of the falls injuries are directly connected with machinery. Four per cent. were eye injuries.

MANY ACCIDENTS PREVENTABLE

Half of the whole number of accidents were preventable, in the opinion of the board. But it is curious to see that of the preventable 50 per cent., the board credits only a third, or one-sixth of the total number, to practicable improvements and applications of safety equipment in factories and other plants. Two-thirds of the saving, says the board, must come from a general "safety first" campaign, both among employers and employees, and especially among the latter. It is admitted that carelessness on the part of the employee—ragged or loose clothing which is caught in moving machinery, the neglect of cautionary rules, and the general contempt of familiarity with machines—is a constant and large element in causing accidents. It is quite apparent that care on the part of workers would avoid nearly the whole of the 50 per cent. of preventable accidents, many of the special cases reported by the board showing that the serious injuries represented in photographs of the victims, though they might have been prevented by safety guards on the machines, were even more easily avoidable by intelligent care.

But intelligent carefulness all the time is plainly beyond the capacity or habits of a large proportion of industrial employees, and the employer must look out for his own interests by both safety engineering and constant discipline and training of his employees. The first type of prevention is practicable, and probably less expensive than the payment of compensation due to accidents caused by the lack of thorough engineering precautions. In the list of specific causes presented in the report, the most important and serious seem to be unguarded belts and gear intakes, roller intakes, machinery that is not protected below the working table, and surrounding floor surfaces on which an employee slips, falls, and comes into dangerous relations with moving machinery. Projecting bolt-heads, which catch on clothing and draw a hand or arm between moving parts, are another serious feature.

INSURANCE COMPANIES WORK TO PREVENT ACCIDENTS

As to accident prevention, the report presents a large mass of matter from the various insurance companies taking industrial liability risks in Massachusetts which presents the work of those companies in accident prevention for the benefit of their policy holders and themselves. The reports from the companies point out a good many defects in equipment and general conditions in plants which must be familiar to everyone acquainted with manufacturing. The good and profitable results of safety work are urged in almost every company statement, and in some cases striking figures are presented in support of the general argument. Thus the Travellers' Company reports that in the 10 months following its overhauling of the Pennsylvania Railroad's repair shops, which employed a total of 33,000 men, there was a decrease of 65 per cent. in accidents as compared with the corresponding 10 months of the year before.

Insurance rating based on the safety equipment of a plant, and on the general discipline and management of the employees in relation to accident avoidance, is a logical development which is making its appearance in liability insurance. The Ætna Company has lately undertaken to give special rates based on a standard of accident prevention devices and management, and something of this kind is likely to make a slow advance through the whole field of workmen's insurance, just as it now exists in the fire insurance field. It seems all the more important for employers to undertake such prevention as is open to them because of the evident fact that there will always be a large minimum of incurable carelessness and unintelligence on the part of employees.

Contraband of War

Cone Johnson, solicitor of the State Department, has prepared a statement regarding possible seizure of vessels and cargoes, which is as follows:

"Vessels flying the flag of one of the belligerents are subject to seizure and confiscation by the opposing belligerents. Contraband of war on board such vessels is, of course, subject to confiscation, though the property is neutral.

"Goods not contraband, belonging to a neutral aboard a captured vessel, are subject to delay and interruption consequent upon the seizure of the vessel, but not to confiscation, upon manifestation of neutral ownership and the non-contraband character of the goods.

"When a vessel containing a cargo of a citizen of the United States is captured and is carried before a prize court, as it will be presumably, he should give notice of his claim of property to the prize court authorities and be prepared to furnish proof of his ownership and the non-contraband character of his goods.

"Goods of a neutral, not contraband of war, shipped on a neutral vessel, are not rightfully subject to seizure or interference by any of the belligerents, and it is not presumed that the vessels of neutrals carrying only non-contraband cargoes, will be interfered with."

The State Department has also made public the German proclamation as to contraband of war. The list corresponds as regards absolute contraband to the commodities set forth in the British declaration. As regards both absolute and conditional contrabands, Germany says that she will apply the provisions of the Declaration of London provided the other belligerents do not disregard them.

Nova Scotia steel companies are restricting operations because of financial conditions developed by the European war. Both the Dominion Steel Company and the Nova Scotia Steel & Coal Company are running only a portion of their works. It is also understood that the ore mines of Newfoundland have been partly shut down for the same reason.

The Poole Engineering & Machine Company, Woodberry, Baltimore, Md., announces that the business formerly conducted by Poole Engineering & Machine Company has been reorganized with S. Proctor Brady as president, and the business will be continued under the corporate name of The Poole Engineering & Machine Company.

PIG PRODUCTION FIRST HALF

Decrease of 1,941,456 Gross Tons, or Over 13.4 Per Cent., on Last Half of 1913

(*See Table on Opposite Page*)

Special statistical bulletin No. 7, issued by the Bureau of Statistics of the American Iron and Steel Institute, William G. Gray, statistician, gives the official figures of the production of pig iron in the United States in the first six months of 1914. The total production was 12,536,094 gross tons, against 14,477,550 tons in the last half of 1913, a decrease of 1,941,456 tons, or over 13.4 per cent. In the first half of 1913 the output was 16,488,602 tons. Comparing the output in the first half of 1914 with the output in the first half of 1913 shows a decrease of 3,952,508 tons, or over 23.9 per cent. A few thousand tons of ferrophosphorus, ferrotitanium, ferrovanadium, and other ferroalloys are included for each of the half years.

The following table gives the production of pig iron in the United States in half-yearly periods since 1900.

Years. Gross tons.	First half.	Second half.	Total.	Increase.	Decrease.
1900	7,642,569	6,146,673	13,789,242	.....	1,495,896
1901	7,674,613	8,203,741	15,878,354	529,128	.....
1902	8,808,574	9,012,733	17,821,307	204,159	.....
1903	9,707,367	8,301,885	18,009,252	.....	1,405,482
1904	8,173,438	8,323,595	16,497,033	150,157	.....
1905	11,163,175	11,829,205	22,992,380	666,030	.....
1906	12,582,250	12,724,941	25,307,191	142,691	.....
1907	13,478,044	12,303,317	25,781,361	.....	1,174,727
1908	6,918,004	9,018,014	15,936,018	2,100,010	.....
1909	11,022,346	14,773,125	25,795,471	3,750,779	.....
1910	14,978,738	12,324,829	27,303,567	.....	2,653,909
1911	11,666,996	11,982,551	23,649,547	315,555	.....
1912	14,072,274	15,654,663	29,726,937	1,582,389	.....
1913	16,488,602	14,477,550	30,966,152	.....	2,011,052
1914	12,536,094	.....	.....	.....	.....

The maximum production in any two half-yearly periods was reached in the 12 months from July 1, 1912, to June 30, 1913, when the output amounted to 32,143,265 tons. The next largest output was in the 12 months of 1913, when 30,966,152 tons was made. The output in the first six months of 1914 was the smallest in any half year since the last half of 1911.

In the following table the production of basic pig iron is given by States in the first half of 1914 and the two halves of 1913. The production of basic pig iron in the first half of 1914 and the two halves of 1913 includes a small tonnage of pig iron of basic quality made with charcoal as fuel.

States—Gross tons.	Production—Gross tons.			Decrease in first half of 1914.	
	First half 1913.	Second half 1913.	First half 1914.	Compared first half 1913.	Compared second half 1913.
New York and N. J.	264,661	299,691	153,112	111,549	146,579
Pa.—Allegheny Co...	1,697,820	1,616,950	1,326,364	371,456	290,586
" Other...	1,959,780	1,660,445	1,346,789	612,991	313,656
Virginia, Alabama	463,539	367,649	295,283	168,256	72,366
Ohio	815,900	959,325	798,505	17,395	160,820
Indiana and Illinois	1,162,902	1,004,471	942,104	220,798	62,367
Mich., Mo., and Col.	145,409	118,151	148,490	* 3,081	*30,339
Total	6,510,011	6,026,682	5,010,647	1,499,364	1,016,035

* Increase.

The production of Bessemer and low-phosphorus pig iron by States in the first half of 1914 is compared below with the production in the two halves of 1913.

States—Gross tons.	Production—Gross tons.			Decrease in first half of 1914.	
	First half 1913.	Second half 1913.	First half 1914.	Compared first half 1913.	Compared second half 1913.
New York	360,813	204,947	170,854	189,959	34,093
Pennsylvania	2,351,308	2,127,529	1,880,451	470,857	247,078
Maryland	152,002	137,957	101,605	50,397	36,352
W. Va., Ky., Tenn.	156,359	137,486	112,339	44,020	25,147
Ohio	2,263,949	1,920,153	1,551,795	712,154	368,358
Ill., Wis., Col., Cal.	1,001,535	776,075	561,054	440,481	215,021
Total	6,285,966	5,304,147	4,378,098	1,907,868	926,049

The output of Bessemer pig iron alone, not including low-phosphorus pig iron, amounted to 4,247,464 tons in the first half of 1914, as compared with 5,146,247 tons in the last half of 1913, a decrease of 898,783 tons, and 6,127,048 tons in the first half of that year. The production of low-phosphorus pig iron alone in the first half of 1914 amounted to 130,634 tons, as compared with 157,900 tons in the last half of 1913, a decrease of 27,266 tons.

The production of pig iron by grades in the first half of 1914, as compared with the two halves of 1913, is given in the following table; also the increase or decrease by grades in the first half of 1914 as compared with the first half and second half of 1913.

Grades—Gross tons.	Production—Gross tons.			Decrease in first half of 1914.	
	First half 1913.	Second half 1913.	First half 1914.	Compared first half 1913.	Compared second half 1913.
Basic	*6,510,011	*6,026,682	*5,010,647	1,499,364	1,016,035
Bess. and low-phos.	6,285,966	5,304,147	4,378,098	1,907,868	926,049
Foundry and ferro-sil.	2,881,002	2,339,341	2,454,540	426,462	†115,199
Malleable	482,902	510,834	383,139	99,763	127,695
Forge pig iron	182,871	141,536	197,483	†14,612	155,947
Spiegeleisen	56,856	53,482	36,939	19,917	16,543
Ferro-manganese	54,387	65,108	49,215	5,172	15,893
White and mottled, direct castings, ferro-tit., ferro-van., etc.	34,607	36,420	26,033	8,574	10,387
Total	16,488,602	14,477,550	12,536,094	3,952,508	1,941,456

* Include a small quantity of basic pig iron made with charcoal. † Increase.

Included in the 2,454,540 tons of foundry and ferrosilicon pig iron reported for the first half of 1914 is about 76,930 tons of ferrosilicon, Bessemer ferrosilicon, and electrolytic ferrosilicon, made in New York, Pennsylvania, Virginia, West Virginia, Kentucky, Tennessee, Ohio, and Illinois. In the last half of 1913 about 59,534 tons of ferrosilicon, Bessemer ferrosilicon, and electrolytic ferrosilicon was made, as compared with about 46,181 tons in the first half of that year. Pig iron containing 7 per cent. of silicon and over is classified as ferrosilicon. Electrolytic ferrosilicon as a rule contains about 50 per cent. of silicon. Nearly all the charcoal iron is classified as foundry pig iron.

The forms in which the pig iron made in the first half of 1914 was cast or delivered to mixers, open-hearth furnaces, foundries, etc., are given below.

States. Gross tons.	Molten condition.	Sand cast.	Machine cast.	Chill cast.	Direct castings.	Total. Gross tons.
Mass. and Conn.	.....	4,292	.....	.....	.....	4,292
N. Y., N. J., Md.	298,998	430,911	114,218	75,170	733	920,030
Pennsylvania	3,124,676	672,768	1,288,038	119,476	2,093	5,207,051
Va., Ala., W. Va.	269,684	735,032	107,479	48,075	1,641	1,161,911
Ky. and Miss.	.....	41,813	.....	.....	.....	41,813
Tennessee	.....	108,009	.....	5,128	.....	113,137
Ohio	1,541,723	405,061	788,576	127,398	2,009	2,865,367
Indiana, Ill., Mich., & Col.	1,301,587	150,921	564,363	.....	443	2,017,314
Wis., Minn., Mo., and Cal.	.....	196,168	.....	9,000	11	205,179
Total 1st half '14	6,536,668	2,744,975	2,862,674	384,247	7,530	12,536,094
Total last half '13	7,668,863	3,004,168	3,275,207	519,668	9,644	14,477,550
Total 1st half '13	9,069,845	3,685,512	3,246,964	480,503	5,778	16,488,602

The total number of completed and rebuilding blast furnaces on June 30, 1914, was 457, against 462 December 31, 1913. According to fuel used, the number of bituminous coal and coke furnaces was 393 June 30, against 394 December 31; anthracite and anthracite and coke, 21, against 23; charcoal, 43, against 45.

On June 30 there were 3 furnaces in course of erection and 13 were being rebuilt. Of the new furnaces 1 is in Pennsylvania and 2 are in Minnesota. When completed all will use coke for fuel. They will have a total annual capacity of 505,000 gross tons of pig iron.

During the first half of 1914 there were 5 blast furnaces abandoned or dismantled, with a total annual capacity of 200,500 gross tons, as follows: New Jersey, 1; Pennsylvania, 2; Virginia, 1; and Michigan, 1. When last in blast 2 of these furnaces used charcoal, 1 used anthracite coal and coke and 2 used coke.

PRODUCTION OF PIG IRON IN THE UNITED STATES IN THE FIRST SIX MONTHS OF 1914.

Statistics Collected from the Manufacturers by the Bureau of Statistics of The American Iron and Steel Institute, all in Gross Tons of 2,240 pounds.

Production in the First Half of 1913, 16,488,602 Gross Tons; Second Half of 1913, 14,477,550 Tons; First Half of 1914, 12,536,094 Tons.

Total Production of All Kinds of Pig Iron.

TOTAL PRODUCTION OF PIG IRON BY STATES.

States. Gross tons.	Blast Furnaces. In blast Dec. 31, 1913.	June 30, 1914. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1913.	Second half of 1913.	First half of 1914.
Massachusetts	1	0	2	2	8,581	4,229	4,292
Connecticut	1	1	2	3			
New York	12	13	15	28	1,193,450	994,170	818,425
New Jersey	2	2	4	6			
Pennsylvania	78	76	83	159	6,885,058	6,069,878	5,207,051
Maryland	1	2	3	5	152,002	137,957	101,605
Virginia	8	8	15	23	192,530	149,285	164,796
Georgia	0	0	4	4			
Texas	0	0	4	4			
Alabama	23	20	29	49	1,078,173	979,738	902,186
West Virginia	1	1	3	4			
Kentucky	1	1	7	8	165,000	150,731	136,742
Mississippi	0	0	1	1			
Tennessee	4	6	12	18	189,019	91,522	113,137
Ohio	40	43	32	75	3,660,473	3,469,052	2,865,367
Illinois	11	12	14	26	1,653,017	1,274,815	1,045,905
Indiana	5	8	2	10	894,743	881,140	851,700
Michigan	10	8	6	14			
Wisconsin	4	3	4	7	222,167	145,159	195,991
Minnesota	1	1	0	1			
Missouri	1	1	1	2			
Colorado	1	2	4	6			
Oregon	0	0	1	1	194,389	129,874	128,897
Washington	0	0	1	1			
California	0	0	0	0			
Total	205	208	249	457	16,488,602	14,477,550	12,536,094

PRODUCTION OF BITUMINOUS COAL AND COKE PIG IRON.

New York	12	13	10	23	1,193,450	994,170	818,425
New Jersey	2	2	4	6			
Pennsylvania	70	69	66	135	6,678,179	5,972,037	5,147,691
Maryland	1	2	2	4	152,002	137,957	101,605
Virginia	7	7	13	20			
Georgia	0	0	2	2	191,203	147,372	163,330
Texas	0	0	3	3			
Alabama	21	19	26	45	1,061,640	963,821	893,867
West Virginia	1	1	3	4			
Kentucky	1	1	6	7	165,000	150,728	136,617
Tennessee	4	6	11	17	188,574	89,632	113,137
Ohio	40	42	31	73	3,659,723	3,467,801	2,865,267
Illinois	11	12	14	26	1,653,017	1,274,815	1,045,905
Indiana	5	8	2	10			
Michigan	3	1	2	3	945,277	862,383	890,814
Wisconsin	3	3	3	6			
Minnesota	1	1	0	1			
Missouri	0	0	1	1			
Colorado	1	2	4	6	219,780	157,569	158,162
Washington	0	0	1	1			
California	0	0	0	0			
Total	183	189	204	393	*16,107,845	*14,218,285	*12,334,820

*Include small quantities of pig iron and ferro-alloys made with coke and electricity, etc.

ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

New York	0	0	3	3	204,575	95,466	57,507
Pennsylvania	5	5	13	18			
Total	5	5	16	21	204,575	95,466	57,507

PRODUCTION OF CHARCOAL PIG IRON BY STATES.

Massachusetts	1	0	2	2	8,581	4,229	4,292
Connecticut	1	1	2	3			
New York	0	0	2	2			
Pennsylvania	3	2	4	6	2,304	2,375	1,853
Maryland	0	0	1	1			
Virginia	1	1	2	3	1,327	1,913	1,466
Alabama	2	1	3	4	16,533	15,917	8,319
Georgia	0	0	2	2			
Texas	0	0	1	1			
Kentucky	0	0	1	1	445	1,893	125
Tennessee	0	0	1	1			
Mississippi	0	0	1	1			
Ohio	0	1	1	2	750	1,251	100
Michigan	7	7	4	11	115,183	108,896	106,203
Wisconsin	1	0	1	1			
Missouri	1	1	0	1			
Oregon	0	0	1	1	31,059	27,325	21,409
California	0	0	0	0			
Total	17	14	29	43	* 176,182	* 163,799	143,767

*Include small quantities of pig iron and ferro-alloys made with charcoal and electricity.

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Bituminous	183	189	204	393	16,107,845	14,218,285	12,334,820
Anth & anth & coke	5	5	16	21	204,575	95,466	57,507
Charcoal	17	14	29	43	176,182	163,799	143,767
Total	205	208	249	457	16,488,602	14,477,550	12,536,094

Miscellaneous Pig Iron Statistics.

PRODUCTION OF PIG IRON IN PENNSYLVANIA AND OHIO.

	Districts. Gross tons.	Blast Furnaces. In blast Dec. 31, 1913.	June 30, 1914. In.	Out.	Total.	Production—Gross tons. (Includes spiegeleisen, ferro-manganese, ferro-silicon, ferro-phosphorus, etc.) First half of 1913.	Second half of 1913.	First half of 1914.
Pennsylvania.	Lehigh Valley	9	8	13	21	580,591	473,095	421,491
	Schuylkill "	8	9	8	17	484,257	381,702	371,729
	L. Susq. "	6	4	11	15	372,781	262,298	197,891
	Juniata "	2	1	6	7	80,110	60,063	58,641
	Allegheny Co.	24	29	18	47	3,128,446	2,871,093	2,483,312
	Shenan. Valley	11	9	15	24	1,222,686	1,066,007	805,741
	Miscel. bitum.	15	14	8	22	1,013,883	953,245	866,443
	Charcoal	3	2	4	6	2,304	2,375	1,853
Ohio.	Mahoning Val.	11	17	8	25	1,512,690	1,475,280	1,229,588
	Hocking "	0	0	1	1			
	Lake Counties	12	11	6	17	1,142,044	1,085,493	898,900
	Miscel. bitum.	7	7	8	15	788,074	679,934	527,848
	H. R. bitum.	10	7	8	15	216,915	227,094	208,931
	H. R. charcoal	0	1	1	2	750	1,251	100

PRODUCTION OF DESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	360,813	204,947	170,854
Pennsylvania	2,351,308	2,127,529	1,880,451
Maryland	152,002	137,957	101,605
West Virginia, Kentucky, and Tenn.	156,359	137,486	112,339
Ohio	2,263,949	1,920,153	1,551,795
Illinois, Wisconsin, Colorado, and California	1,001,535	776,075	561,054
Total	6,285,966	5,304,147	4,378,098

PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON IN PENNSYLVANIA AND OHIO BY DISTRICTS.

Pennsylvania.	Lehigh Valley	120,294	149,678	141,679
	Schuylkill Valley			
	Lower Susquehanna Valley	79,420	42,399	44,003
	Allegheny County	1,314,068	1,165,177	1,055,600
	Shenango Valley	846,526	770,275	639,169
	Miscellaneous bituminous			
Ohio.	Mahoning Valley	980,925	890,635	698,872
	Lake Counties	707,533	564,338	479,845
	Hanging Rock bituminous	575,491	465,180	373,078
	Miscellaneous bituminous			

PRODUCTION OF BASIC PIG IRON.

New York and New Jersey	264,661	209,691	153,112
Pennsylvania—Allegheny County	1,697,820	1,616,950	1,326,364
" Other counties	1,959,780	1,660,445	1,346,789
Virginia	463,539	367,649	295,283
Alabama			
Ohio	815,900	959,325	798,505
Indiana and Illinois	1,162,902	1,004,471	942,104
Michigan, Missouri, and Colorado	145,409	118,151	148,490
Total	6,510,011	6,026,682	5,010,647

PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

Pennsylvania	111,243	118,590	86,154
Alabama			
Illinois			
Colorado			
Total	111,243	118,590	86,154

PRODUCTION OF ALL KINDS OF PIG IRON FROM 1909 TO 1913.

States—Gross tons.	Production—(Includes spiegeleisen, ferro-manganese, etc.) 1909.	1910.	1911.	1912.	1913.
Massachusetts	18,388	16,582	9,649	17,366	12,810
Connecticut					
New York	1,733,675	1,938,407	1,562,756	1,939,231	2,187,620
New Jersey	294,474	264,781	40,663	36,876	
Pennsylvania	10,918,824	11,272,323	9,807,073	12,552,131	12,954,936
Maryland	286,856	326,214	255,816	219,546	289,959
Virginia	391,134	444,976	293,642	256,167	341,815
Georgia	26,072	14,725	1,200		
Texas					
Alabama	1,763,617	1,939,147	1,712,211	1,862,681	2,057,911
West Virginia	228,282	174,661	291,472	274,360	315,731
Kentucky	86,371	100,509	95,202	68,760	
Mississippi					
Tennessee	333,845	397,569	324,648	338,238	280,541
Ohio	5,551,545	5,752,112	5,310,506	6,802,493	7,129,525
Illinois	2,467,156	2,675,646	2,108,002	2,887,359	2,927,842
Indiana	964,289	1,250,103	1,163,932	1,770,628	1,775,884
Michigan					
Wisconsin	348,177	397,200	276,807	303,370	367,326
Minnesota					
Missouri					
Colorado	382,766	428,612	395,968	397,731	324,263
Washington					
California					
Total	25,795,471	27,303,567	23,649,547	29,726,937	30,966,152

The Ball Engine Company, Erie, Pa., has placed a contract with Constable Brothers, of Erie, for the construction of a new steam shovel erecting shop, 150 x 203 ft., adjacent to the present plant. It will be equipped with a 60-ft. span, 20-ton crane overlapping two 40-ft. 10-ton cranes.

ESTABLISHED 1855

THE IRON AGE

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Quick Reading of the Pig-Iron Barometer

The total, for the first half of the year, of *The Iron Age's* monthly pig-iron statistics covering coke and anthracite pig iron, but not the charcoal product, which is so small as to be negligible, was 12,402,015 tons. The American Iron and Steel Institute's statistics published this week and those of *The Iron Age* compare as follows:

American Iron and Steel Institute figures....	12,392,327 tons
The Iron Age's figures.....	12,402,015 tons
Difference.....	9,688 tons

The point we would make in connection with the above comparison is that the iron trade is given an exceedingly accurate picture of the pig-iron status in these monthly statistics. The variation shown above is less than 8-100 of 1 per cent. It is to be considered that while the official statistics, which are checked up with great care, appear six weeks after the close of the half-year period, our monthly statistics are often published on the fourth or fifth day after the close of the month and have appeared as early as the third day. Many of the returns our blast-furnace friends send us must necessarily be telegraphed, involving additional chances of error. Considering all the conditions, including the speed with which these statistics are handled in this office, it must be said that our monthly canvass of more than 400 blast furnaces makes a remarkably close approach to the figures finally arrived at in the official statement. Scarcely is a month over before the entire pig-iron producing and consuming trade knows what change that month has made in the situation. Seven or eight days are required for the working up of the copper statistics, and the 10th is the usual date for the publication of crop estimates and other similar data. Pig iron is the only one of the barometers of trade from which readings can be taken practically at the beginning of each month.

The Amended Navigation Law

Early relief is promised to American exporters by the navigation law amendment enacted by Congress on Monday. This law admits to United States registry American-owned foreign-built vessels for the oversea trade without regard to the time when they were built. Also, the President is authorized to suspend for such length of time as he may deem desirable the provisions of law prescribing that all the watch officers of vessels of the United States registry for foreign trade shall be citizens of the United States. Under the terms of this enactment, however, the foreign-built ships admitted to registry will not be entitled to enter the coastwise trade of this country.

A vigorous fight was made to throw open our coasting trade to all vessels flying the United States flag, but the opposition to such a provision was sufficiently strong to defeat it. It is noteworthy that in this opposition party lines were broken down and that prominent members of the dominant political party arrayed themselves in favor of continuing the restriction of the coastwise trade to American-built vessels that has prevailed from the foundation of the Government. The usual charges of the coastwise trade being a monopoly were brought out, but the bogey of monopoly failed to stampede Congress for the removal of the time-honored restriction.

It is fortunate for our shipbuilding interests that the coasting trade has not been thrown open to foreign-built vessels. Serious results would have been realized if such navigation had been made free to all shipping interests. American shipbuilders are obliged to pay a much higher scale of wages than prevails in foreign shipyards, and few vessels would be built here if the coastwise trade had been thrown open to the competition of more cheaply built foreign vessels. It is difficult to see how the claim of monopoly can be made, as the coastwise trade is open to all American citizens who care to make investment in American-built ships for the purpose of participating in this business.

Rolled Iron and Steel in 1913

It was known by the close of 1913 that the production of steel in that year was approximately as large as in 1912, and when, a few weeks ago, statistics were published showing slight decreases for 1913 in the total output of plates and sheets, as well as of wire rods, it became interesting to know where the increases fell. The statistics for 1913 have now been completed by the Bureau of Statistics of the American Iron and Steel Institute, and a brief résumé can be made of the changes in proportionate output of the different lines. These changes are readily seen, because the total of all rolled iron and steel showed only a slight change, increasing from 1912 to 1913 by 134,402 gross tons, or only about 5-10 of 1 per cent., the 1913 total being 24,791,243 tons.

Rails, as reported early in the year, increased by 174,865 tons to 3,502,780 tons. Plates and sheets decreased by a slightly smaller amount, while

rods showed a decrease and structural shapes an increase.

Possibly the most interesting change was in merchant bars, the statistics now gathered showing an increase of 260,495 tons, or 7.0 per cent., to 3,957,609 tons. There was an increase in iron bars, included in the figure just mentioned, of 81,842 tons, to 1,026,632 tons. It is not always recognized that the iron bar industry has proved rather a hardy one, and has lost no ground in recent years, though it is true there have been material losses since 1907. At the present time more than one-fourth the merchant bar tonnage is iron.

Iron skelp has not shown as great vitality, as there was a slight decrease in 1913, and the total for that year, 312,746 tons, was the smallest for any year, barring 1908, since the collection of separate statistics was instituted in 1905. The maximum reported was for that year, 452,797 tons, the production of steel skelp being 983,198 tons, while in 1913 the production of steel skelp was 2,189,218 tons, a record tonnage. From 1905 to 1913 the proportion of iron skelp to total skelp decreased from 31.5 per cent. to 12.5 per cent.

The production of concrete reinforcing bars has increased rapidly, in point of percentage, the tonnage doubling in four years from 1909 to 1913, even though the total in 1913 was only 319,670 tons.

Dissolving a "Good" Trust

The decision just rendered in the International Harvester Company case by the United States District Court at St. Paul, causes us to recall with mixed emotions the sentiments expressed in these columns two weeks ago under the caption "Some Aspects of 'Trust' Legislation." The remark was there made:

> A really striking feature of the pending trust legislation is its close reference to business practices and its almost complete lack of reference to the size of business interests it seeks to control. Some of the early decisions under the Sherman law took a diametrically opposite view—that the holding of the power, not the exercise of it, constituted the question to be decided.

The Harvester decision is of great interest in several respects. If ever a trust was given a clean bill of health, the International Harvester Company has been given one by the court. It is not overcapitalized, it has treated its competitors and its customers fairly, and it has extended foreign trade. The worst thing it did was to advertise one of its constituents as "against the trust," and that was years ago. It is sound and healthy and no menace to society, but on account of its birth having been utterly illegal it cannot be received in polite circles.

We would not intimate that the decision rendered by the District Court is not in accordance with previous decisions of the Supreme Court or the law of the land, but we do strongly urge that the very letter and spirit of this decision furnish a weighty argument for modifying the existing law. The decision itself says:

> There is no limit under the American law to which a business may not independently grow, and even a combination of two or more businesses, if it does not unreasonably restrain trade, is not illegal.

Following this statement the argument is made that the combination of companies having 80 or 85 per cent. of the business eliminated competition between them, and since these companies unconsolidated would not have been permitted to conspire with each other to eliminate the competition, then they cannot be permitted to combine when such combination would have precisely the same effect.

If the rule here laid down could be worked both ways, it would mean that, since a few competing companies can combine if the combination does not involve an unreasonable restraint of trade, then those same companies could, without merging, enter into an agreement as to prices or restriction of production. This is scarcely the common acceptation of the law.

The Harvester decision furnishes a strong argument for so clarifying or amending existing law, that conduct, not unexercised power, shall be the measure of guilt or innocence. The record in the case is that the company did not to any extent exercise its power in the direction of injury, and that, on the other hand, its formation gave it a power for good, in extending foreign trade, and this power it did exercise.

Judge Sanborn, in his dissenting opinion, says that the opinion of the court seems to err in giving "insufficient consideration to the trade conduct of the defendants at the time this suit was commenced, in April 1912, and for seven years before that date; the crucial issue being conduct in that time and not in 1902 or 1903. It would be well, indeed, if legislation could be framed to make such a view the governing one in court decisions. Had Judge Sanborn's view been embodied in a Supreme Court decision prior to the Steel Corporation dissolution suit, the Government's attorneys in that case would not have concentrated their attack in the way they did upon practices which, as abundant evidence showed, the corporation had abandoned.

Mid-Year Pig-Iron Statistics

The Bureau of Statistics of the American Iron and Steel Institute reports the production of pig iron in the United States in the first half of 1914 at 12,536,094 gross tons, showing a decrease of 13.4 per cent. from the second half of 1913, and of 23.9 per cent. from the first half of 1913, that having been the record half year. The decreases from the 1912 production were marked, and one must go back to 1911 to find production at as low a rate as in this year. It may be remarked, too, that production since July 1 has been at an average rate of less than 24,000,000 tons, so that thus far nothing has been accomplished toward making a better record in the second half of this year than in the first half.

There were some interesting changes in the distribution of pig iron by grades. While from the second half of 1913 to the first half of 1914 the total pig-iron production decreased by 13.4 per cent., the production of foundry pig iron increased 115,199 tons, or 4.9 per cent., while the production of forge pig iron increased 55,947 tons, or almost 40 per cent. As there had been a large drop in foundry pig-iron production during 1913, it is reasonable to surmise that stocks carried over July, 1913, were much larger than were carried over January 1, 1914, so that the consumption of foundry iron did not show the wide fluctuation indicated by the production.

BRASS FURNACE PRACTICE

The Extent of the Industry in This Country—Melting and Fuel Losses

"Brass Furnace Practice in the United States" is the title of an important bulletin, No. 73, of 287 pages, issued by the Bureau of Mines, Washington, D. C. The investigation was undertaken to ascertain the melting and fuel losses in present brass-melting practice and to indicate, as far as possible, methods by which these losses might be reduced. Dr. H. W. Gillett, alloy chemist of the bureau, conducted the investigation and is the author of the bulletin.

The magnitude of the industry and other important features are indicated in the following extracts from the preface by Charles L. Parsons, chief of the division of mineral technology of the bureau:

There are in America today some 3600 plants melting brass and bronze, and 1000 of these melt nonferrous alloys exclusively. Allowing for the present recovery of waste metal, it appears that in current practice, between the purchase of the raw metal and the completion of the finished product, at least 5 per cent. of the original metal is lost.

In the melting of nonferrous alloys, taking into consideration all such alloys and all furnaces and fuels used, it is shown that from 90 to 95 per cent. of the heat units in the fuel do no useful work. On the basis of $120,000,000 being the value of the metal passing through brass and bronze furnaces each year, a 2½ per cent. melting loss, equivalent to 5 per cent. loss on metal bought, means an annual loss of $3,000,000 in metal alone. Simply reducing the average metal loss to that of present best practice would mean a saving of over $1,500,000 a year. If fuel efficiency and crucible life could be brought from present average to best practice, half million dollars more, at least, could be saved.

One of the most striking facts to which attention is called by this investigation is the lack of proper control and of proper records in most of our furnace practice. Few of the plants are under technical control. The firms that keep proper records, and hence have the necessary knowledge, invariably employ a trained metallurgist to supervise the melting furnaces, and these firms almost always have the lowest losses. The lack of technical control is emphasized by reports of metal losses varying from one-tenth of 1 per cent. to 22 per cent. and fuel efficiency from 1½ to 16 per cent. The need for thorough technical control in the majority of our foundries and casting shops has been made evident by this investigation.

Another waste not so readily expressed by figures but which none the less really exists is the loss of efficiency of the workers in the industry through occupational disease and accidents due to a lack of safety precautions. A few of the firms reporting have given careful consideration to the prevention of disease and accidents, and it is shown that by the enforcement of simple, proper precautions occupational disease may be eliminated and the nonferrous alloy industry placed beyond reproach as to the health and safety of its employees.

Investigation has also magnified the need of an efficient electric melting furnace in the alloy industry and a pyrometer which can be used as a workman's tool. These two problems are now under investigation by the Bureau of Mines.

LOSSES OF METAL AND FUEL

The monetary value of the losses and the consumption of copper are thus discussed by Dr. Gillett:

The losses, both of metal and fuel, in melting brass and bronze are large. The net loss of metal, if all recovery of any sort be deducted and if all the brass and bronze alloys be included, will average not less than 2.5 per cent. Extreme figures reported are 22 and 0.1 per cent., the former figure being unusual and not representing regular practice and the latter not being verified. Extremes of 8 and 0.5 per cent. are well substantiated. The total melt will average about twice the raw metal bought, because of the remelt of crop ends and scrap in rolling mills and of gates and sprues in foundries. Some foundries making light castings melt 3 lb. of metal to get 1 lb. of castings. A ratio of 2 lb. of metal to 1 lb. of castings is common, and 1½ to 1 is low. If, then, the whole industry be considered, a loss of 2.5 per cent. on the gross melt is equal to about 5 per cent. on the raw metal bought.

The consumption of copper in the United States in 1911 was about 680,000,000 lb. If two-thirds of this total, or 450,000,000 lb., be considered as having been used for making brass and bronze, and if the average copper content of the alloys used be assumed as 80 per cent., the deduction would be that about 560,000,000 lb. of brass and bronze products was made from new copper. It seems conservative to estimate that at least two-thirds of the copper consumed in the country is in the form of brass and bronze, as W. S. Lathrop states that one corporation, making mainly wrought yellow brass, uses in its various plants approximately a third of all the copper consumed in the United States. To this must be added the old metal used. Half as much old scrap or alloyed ingot as new metal, that is, 280,000,000 lb., seems a fair estimate, so that 840,000,000 lb. should represent the total metal bought. The average value of brass and bronze being taken at 15c. a pound, by this method of figuring $126,000,000 would be the value of the metal passing through the brass and bronze furnaces of the United States in a year. For purposes of computation the estimate of $120,000,000 has been taken.

A 2½ per cent. melting loss, equivalent to a loss of 5 per cent. on the metal bought, thus means $3,000,000 a year lost in metal alone. Could this be reduced to the 2½ per cent. loss (equivalent to 1¼ per cent. on the melt) shown by good practice, a saving of $1,500,000 a year would result. If the fuel consumption and crucible life were brought from the average practice up to good practice, and if furnaces that cut down or eliminate crucible cost and allow greater production with less labor cost were used wherever practicable, a saving of at least another half million would be made, or a total of $2,000,000 a year that the nonferrous-alloy industry of the United States might save merely by bringing average furnace practice up to the standard of the best practice.

The fuel efficiency is found to vary between 1½ and 16 per cent., the average being 4 to 9 per cent. If all fuels and all furnaces be considered it is doubtful whether the average fuel efficiency is more than 7 per cent. of the theoretical.

Dr. Gillett sent out about 2000 lists of questions to 1650 plants, only 230 of which sent any data, and about 50 of these stated that they had no records. The information obtained was supplemented by personal visits to some 80 foundries and rolling mills in 13 states. It is believed that the data obtained represent the practice of the great bulk of firms melting brass.

The Commonwealth Steel Company, Granite City, Ill., on August 15 presented to 165 men, each of whom had completed eight years in the company's service, a five-dollar gold piece in commemoration of the event. Each of the 165 was personally invited to the office of President Clarence H. Howard, who distributed the coins. From this time on it will be the practice to make similar gifts each year. President Howard is also planning rewards for future years for those who have completed more than eight years in the company's service.

The "Determination of Carbon in Steel and Iron by the Barium Carbonate Titration Method" is the subject of paper No. 33 of the Bureau of Mines, by J. R. Cain, associate chemist. The method is claimed to be as accurate as the weighing methods and not so subject to disturbing influences. It also requires less elaborate apparatus.

War Stops New Buffalo Coke Plant

Work on the large by-product coke-oven plant of the Niagara Coke Corporation at Lackawanna City, near Buffalo, N. Y., has been temporarily suspended. This undertaking has been largely financed in Germany through the Otto Coking Company, whose type of coking ovens is to be used, and the suspension of the work has been caused by the complete cutting off of communication and hence the impossibility of maintaining financial arrangements with the German interests. In case the war shall prove protracted, it is expected that plans will be perfected for financial arrangements in this country. George F. McKay of New York City, one of the American representatives of the Otto Company, who was in Buffalo last week, stated that in his belief the suspension of construction work would be brief. Contracts for the disposal of all the company's gas product and for the bulk of its coke and by-products had been entered into before the breaking of ground for the new plant, and arrangements have been made to keep alive these contracts by having their terms remain in abeyance pending the delay in completing the plant.

A Call for Texas Iron Ore

DALLAS, TEXAS, August, 14, 1914.—To an inquiry from an Eastern steel company, received by the Texas Iron & Coal Company, as to how soon the latter could begin the delivery of iron ore to Galveston for shipment to eastern Pennsylvania, a reply was sent saying that orders for ore could be filled immediately. The Texas Iron & Coal Company owns large beds of iron ore in eastern Texas. It is expected that some eastern Pennsylvania furnaces will draw upon Texas ore supplies in lieu of shipments from Europe. It is reported here that Eastern iron and steel manufacturers are also negotiating for the purchase of ore in the Llano iron district, situated about 250 miles to the southwest of the eastern Texas ore fields.

The Sugar Factories Construction & Equipment Corporation, 82 Beaver street, New York City, has been incorporated with a nominal capital for the special purpose of constructing complete sugar factories, including all machinery equipment. H. B. Bradford, vice-president of the Edgemoor Iron Company, Edgemoor, Del., is president of the new company; H. Bruce, vice-president of the Bartlett-Hayward Company, Baltimore, Md., vice-president; H. C. Fox, of Fox Brothers & Co., New York City, secretary-treasurer. These officials, with George Schuhmann, vice-president of the Reading Iron Company, constitute the board of directors.

The annual report of the Platt Iron Works Company, Dayton, Ohio, for the fiscal year ended May 31, 1914, has been issued. The report shows a deficit of $45,360.89 on account of operations, and a further deficit on account of the flood of March, 1913, of $167,822.19. President Waddill Catchings states that much of the operating loss in the past year may be attributed to the flood and resulting conditions. He advised the stockholders that some plan will later have to be adopted, when the company's business expands, to replenish its working capital.

The Chicago, Milwaukee & St. Paul has ordered 20 superheater Mikado type freight locomotives from the American Locomotive Company. The Cincinnati, Hamilton & Dayton is in the market for 30 Mikado and 5 Pacific type locomotives, while the Western Maryland is said to be negotiating for 16 Mallets and the Cleveland, Cincinnati, Chicago & St. Louis for 5 Pacific type and a number of switching engines.

The Bessemer Gas Engine Company, Grove City, Pa., has opened an Eastern office in the Hudson Terminal Building, New York City, in charge of J. W. Macartney, formerly Pittsburgh manager. Mr. Macartney is succeeded in the Pittsburgh office by Burt L. Shaffer, formerly manager of the Parkersburg, W. Va., office.

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Customs Classification of Certain Steel Products

At the suggestion of the appraiser of the port of New York, the Treasury Department has issued a formal order specifying the distinctions to be observed in the application of customs duties between steel bars, bands or strips, sheets and plates. The new rule will make this distinction uniform at all ports. The arbitrary lines of demarcation thus laid down are as follows:

Over 3/16 by 7 in. and under as bars.

Three-sixteenths and under by 7 in. and under as bands or strips.

Over 7 in. in width and up to 2½ in. thick as sheets and plates.

In distinguishing between plates and sheets the department directs that material of the character under consideration thicker than 0.14 in. be classified as plates, and material 0.14 in. thick and thinner be denominated sheets.

American Manganese Mfg. Company

The American Manganese Mfg. Company, which some time ago took over the Dunbar Furnace Company, Dunbar, Pa., is pushing repairs on one furnace with a view to having it in shape to blow in on for the manufacture of 40 per cent. ferromanganese by October 1. The company has some 60,000 tons of Cuyuna range manganiferous iron ores ready for shipment from Minnesota and is mining at the rate of 10,000 tons a month. This ore runs 20 per cent. and upward in manganese and it is expected that the ferromanganese will have a manganese content of 40 per cent. and higher.

The Iron and Metal Markets

FERROMANGANESE EASIER

English Shipments To Be Resumed Soon

Demand for American Steel in Great Britain—New Domestic Business Light but Specifications Active

Early relief of the tension in ferromanganese, which really has become the pivot of the steel situation, is promised from England in our cable of to-day. English makers may be able to ship to this country next week. While their ores from the Caucasus are cut off, a great deal of ore from India, originally sold to Germany, is now being diverted to England. A number of steel companies here are still uneasy about their manganese supply, but there is less excitement. One company which last week offered $150, Baltimore, for 300 tons without getting it, bought 500 tons this week at close to $100. Small lot sales have been made at $100 to $150, Baltimore. The attractive prices have brought out quite a number of lots from second hands.

Some English ferromanganese makers who have deliveries to make in this country through the year have advised their customers that if vessels are obtainable they will resume shipments in September, but an extra charge of 10 shillings a ton will be made, covering war risk insurance and higher freight. Other English sellers who took on considerable business in this country at $36 to $38 are not disposed to ship except at a good advance over contract prices.

Sales of domestic spiegeleisen to eke out the ferromanganese supply are being made at $32 to $35 a ton at Eastern furnaces. The recent buying of spiegel has amounted to 35,000 to 40,000 tons.

Apart from ferromanganese the feature of the situation is the inquiry coming from England for American steel. Already British steel companies, which have long been undersold at home by Continental works, have taken large orders for semi-finished steel from sheet and other rolling mills, these sales running up to 30,000-ton lots. British makers of galvanized sheets have also turned to the United States for sheet bars, which have been quoted at £5 or $24.33, New York. Welsh sheet bars have sold at £5 at Swansea, an advance of $3 a ton, and some makers are asking £6, or nearly $8 a ton more than the price of three weeks ago.

Great Britain will be in the market for a large amount of finished material, originally placed with Continental works, and at the advance of $5 a ton on plates and some other products, which has resulted from the war, some of this business will be attractive to American mills. Several producers in this country have already been feeling the British market.

Canadian inquiry is reported at Pittsburgh for plates, sheets, tin plate and wire products and, though Canadian business conditions have not been good, quite a little additional buying will have to be done in the United States, in the failure of European mills to make deliveries.

Japan has inquired for American low phosphorus pig iron, also for billets, nickel and ferroalloys. South American inquiries have increased also, but financing is the most urgent need in several of the countries to the south. In all the foreign business now coming up, the unusual difficulties of transportation and exchange make negotiations slow and uncertain.

Comparatively little business has been done by steel companies on the 1.20c. basis for bars, plates and shapes. But specifications have been heavy in nearly all finished products so that mills in most lines, with the exception of rails and plates, have kept up their recent rate of operation. Plates can be had at 1.15c. Pittsburgh and on some 1.15c. business in shapes and plates extensions have been given to November 1.

Pacific Coast business has been distributed among a number of mills, particularly in sheets, bars, structural shapes and wire products. By way of New York and the Panama Canal the freight from Pittsburgh to San Francisco is now $9.20 per net ton, against $16 by all rail from Pittsburgh.

One or two wire companies have made an advance of $1 a ton in the past week, or to $1.60 for wire nails and $1.40 for annealed wire. Rods are firmer, in line with this action, and some sellers now ask $25.

Among cases in which German steel might have figured but for the war is that of the sheet piling for government work at Wilmington, Del. The Gelsenkirchen works bid about $1 below Pittsburgh quotations on the 1576 tons required.

Pig iron buying has almost come to a stop. A good many foundries have had cancellations or curtailments of castings contracts and the melt of pig iron has fallen off. Some Southern pipe iron has been bought—about 25,000 tons—and most of the Southern pig iron business has been done at $10, Birmingham, for No. 2. At Buffalo the range of price is $1, but actual sales there are at $13 for No. 2 X rather than $14.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous.

	Aug. 19, 1914.	Aug. 12, 1914.	July 15, 1914.	Aug. 20, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia	$14.75	$14.75	$14.75	$15.65
No. 2, Valley furnace	13.00	13.00	13.00	14.00
No. 2 Southern, Cin'ti	13.25	13.25	13.25	14.00
No. 2, Birmingham, Ala.	10.00	10.00	10.00	10.75
No. 2, furnace, Chicago*	13.75	13.75	13.75	15.00
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.25
Basic, Valley furnace	13.00	13.00	13.00	14.00
Bessemer, Pittsburgh	14.90	14.90	14.90	16.65
Malleable Bess., Ch'go*	14.00	14.00	14.00	15.00
Gray forge, Pittsburgh	13.65	13.65	13.65	14.25
L. S. charcoal, Chicago	15.75	15.75	15.75	15.00
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh	**20.50**	20.00	19.00	25.00
O.-h. billets, Pittsburgh	**20.50**	20.00	19.00	25.00
O.-h. sheet bars, P'gh	**21.50**	21.00	20.00	25.50
Forging billets, base, P'gh.	**26.00**	25.00	25.00	32.00
O.-h. billets, Phila.	**23.40**	22.40	21.90	28.00
Wire rods, Pittsburgh	**25.00**	24.50	24.50	28.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Old Material, Per Gross Ton:	Aug. 19, 1914.	Aug. 12, 1914.	July 15, 1914.	Aug. 20, 1913.
Iron rails, Chicago	$12.00	$12.00	$12.25	$14.00
Iron rails, Philadelphia	14.00	14.00	15.00	17.50
Carwheels, Chicago	11.25	11.25	11.25	12.75
Carwheels, Philadelphia	11.50	11.00	11.00	12.00
Heavy steel scrap, P'gh	11.25	11.50	11.50	12.25
Heavy steel scrap, Phila.	10.50	10.00	10.25	11.50
Heavy steel scrap, Ch'go	9.75	9.75	9.75	10.50
No. 1 cast, Pittsburgh	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia	12.00	12.00	12.00	12.75
No. 1 cast, Ch'go (net ton)	9.50	9.50	9.75	10.75
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia	1.17½	1.17½	1.17½	1.42½
Iron bars, Pittsburgh	1.20	1.15	1.25	1.60
Iron bars, Chicago	1.07½	1.07½	1.05	1.40
Steel bars, Pittsburgh	1.20	1.20	1.10	1.40
Steel bars, New York	1.36	1.36	1.26	1.56
Tank plates, Pittsburgh	1.20	1.20	1.10	1.45
Tank plates, New York	1.36	1.36	1.26	1.61
Beams, etc., Pittsburgh	1.20	1.20	1.10	1.45
Beams, etc., New York	1.36	1.36	1.26	1.61
Skelp, grooved steel, P'gh	1.20	1.15	1.15	1.40
Skelp, sheared steel, P'gh	1.25	1.20	1.20	1.45
Steel hoops, Pittsburgh	1.30	1.25	1.25	1.50
Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.90	1.85	1.80	2.20
Galv. sheets, No. 28, P'gh	2.90	2.85	2.75	3.25
Wire nails, Pittsburgh	1.55	1.55	1.50	1.65
Cut nails, Pittsburgh	1.60	1.55	1.55	1.60
Fence wire, base, P'gh	1.35	1.35	1.30	1.45
Barb wire, galv., P'gh	1.95	1.95	1.90	2.05
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$1.70	$1.70	$1.75	$2.50
Furnace coke, future	1.75	1.75	1.90	2.50
Foundry coke, prompt	2.25	2.25	2.25	2.90
Foundry coke, future	2.35	2.35	2.35	3.00
Metals, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	12.75	12.87½	13.87½	16.00
Electrolytic copper, N. Y.	12.25	12.50	13.62½	15.75
Spelter, St. Louis	5.60	5.35	4.85	5.70
Spelter, New York	5.75	5.50	5.00	5.85
Lead, St. Louis	3.70	3.67½	3.75	4.67½
Lead, New York	3.87½	3 85	3.90	4.75
Tin, New York	39.00	64.25	31.50	41.25
Antimony, Hallett's, N. Y.	16.00	20.00	6.75	7.75
Tin plate, 100-lb. box, P'gh.	$3.50	$3.40	$3.30	$3.50

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.20c. to 1.25c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ⅛ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in	.10
Gauges under 3-16 in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.20c. to 1.25c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.35; galvanized, $1.75. Galvanized barb wire and fence staples to jobbers, $1.95; painted, $1.55. Wire nails to jobbers, $1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.95	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	77	68½	1¼	56	45
2½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap	77	68½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends

2	74	65½	1½	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	68	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.	49
2½ and 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ to 2¾ in.	54
3½ to 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ to 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.
Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.40 to 1.45
Nos. 9 to 10	1.45 to 1.50
Nos. 11 and 12	1.50 to 1.55
Nos. 13 and 14	1.60 to 1.65
Nos. 15 and 16	1.70 to 1.75

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.55 to 1.65
No. 12	1.55 to 1.65
Nos. 13 and 14	1.60 to 1.70
Nos. 15 and 16	1.65 to 1.75
Nos. 17 to 21	1.70 to 1.80
Nos. 22 and 24	1.75 to 1.85
Nos. 25 and 26	1.80 to 1.90
No. 27	1.85 to 1.95
No. 28	1.90 to 2.00
No. 29	1.95 to 2.05
No. 30	2.05 to 2.15

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.90 to 2.00
No. 12	2.00 to 2.10
Nos. 13 and 14	2.00 to 2.10
Nos. 15 and 16	2.15 to 2.25
Nos. 17 to 21	2.30 to 2.40
Nos. 22 and 24	2.45 to 2.55
Nos. 25 and 26	2.60 to 2.70
No. 27	2.75 to 2.85
No. 28	2.90 to 3.00
No. 29	3.05 to 3.15
No. 30	3.20 to 3.30

Pittsburgh

PITTSBURGH, PA., August 18, 1914.

As yet a clear insight as to the effects of the European war on the steel trade cannot be had, but it has already caused a rush of specifications on contracts for plates, shapes, bars, sheets, tin plate and wire products, taken at the lower prices ruling about a month ago. Consumers feel there is little risk in taking in material at prices that are fully $2 a ton lower than the mills are asking now, more especially in view of the fact that the scare as to the supply of ferromanganese, while it has subsided to some extent, is not yet over by any means. The amount of new business taken by the mills at the higher prices they are quoting for this and next month, and also for last quarter delivery, has been small, but this was expected. Local mills report good inquiries for finished iron and steel from England, Canada, the Pacific coast and South America. Little actual business has yet been closed, as bottoms cannot be had, but this may be arranged within a short time. There are many important questions to be settled before foreign shipments can be started, chief among these being that of finances. Of course, with the Pacific coast, this is not so serious, and already some orders have been taken for delivery there by local mills. The all-rail freight from Pittsburgh to the Pacific coast is 80c., but by shipping to New York at 16c. and then through the Panama Canal at 30c., a total freight rate of 46c. is obtained, and it is likely most shipments will go this way. Fairly heavy inquiries from Canada have come here for plates, sheets, tin plate and wire products. Sheets are up about $1 a ton, and two makers have advanced prices $1 a ton on wire products, but this has not been general. Pig iron, coke and scrap are dull. Bessemer and open-hearth billets and sheet bars have been put up 50c. a ton, but no business has yet been closed at the advanced prices. The steel mills are predicating the advances on billets and sheet bars on an acute shortage in the supply of ferromanganese. The consuming trade is going ahead very cautiously, while the steel mills are doing the same, not being willing to make future commitments except at higher prices. Several of the larger steel companies have instructed their sales agents not to accept any orders but to submit inquiries to the home offices for consideration. It is understood that plans are under way to secure bottoms for shipment of iron and steel products to Australia, and several of the local steel mills have fairly large orders for shipment to that country.

Pig Iron.—About the only foundry-iron inquiry out is one for 1500 to 3100 tons of low-silicon and charcoal iron for the Pennsylvania Railroad shops at Altoona, Pa. Corrigan, McKinney & Co. have blown out one of their furnaces at Josephine, Pa., for relining. There is no new inquiry for basic or Bessemer iron, but we note a sale of 100 tons of Bessemer at $14, Valley furnace. Operations among local foundries are slowing down. We quote: Bessemer, $14; basic, $13; malleable Bessemer, $13; No. 2 foundry, $13 to $13.50; gray forge, $12.75, all at Valley furnace, with a freight rate of 90c. a ton for Cleveland or Pittsburgh delivery.

Ferroalloys.—The intense excitement of last week over the question of the supply of ferromanganese has quieted down, but there is still a good deal of uneasiness as to whether there will be a shortage in the supply. As showing how quickly conditions change we can state that last week a leading steel interest offered $150 a ton, Baltimore, for 300 tons of English 80 per cent. ferromanganese, but did not get it. Yesterday this same company bought 500 tons at a few cents less than $100 per ton, Baltimore. There have been numerous sales ranging from carload lots to 100 tons, probably aggregating 1000 tons or more, at prices running from $100 to $150, Baltimore. It is reported that the Carnegie Steel Company has a sufficient supply of manganese ore and ferromanganese on hand to supply its needs into the early part of next year. There are no fixed quotations, prices depending on the amount involved and the deliveries wanted. There has been no advance in ferrosilicon, but local sales agents have been notified not to make any contracts, but to submit all offers to the home offices for action. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent. spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Billets and Sheet Bars.—The Carnegie Steel Company has again advanced its prices and is now quoting Bessemer and open-hearth billets at $20.50 and Bessemer and open-hearth sheet bars at $21.50, f.o.b. mill, freight to point of delivery added. Some fair-sized sales of billets and sheet bars have been made in the past week on the basis of $20 for billets and $21 for sheet bars, one sale being 2000 tons of Bessemer sheet bars at $21, maker's mill. Republic and Youngstown Sheet & Tube are understood to be still quoting $20 for billets and $21 for sheet bars, but will sell only a limited tonnage and for prompt delivery. Prices on forging billets are up $1 a ton. We quote Bessemer and open-hearth billets at $20.50 and Bessemer and open-hearth sheet bars at $21.50, Pittsburgh, and Bessemer and open-hearth billets at $20, and Bessemer and open-hearth sheet bars at $21, Youngstown, but these prices will likely be withdrawn within a few days. We quote forging billets at $26 for desirable orders of one size and up to but not including 10 x 10 in., the regular extras being charged for larger sizes. We quote axle billets at $24 on desirable orders and $25 for small lots, f.o.b. Pittsburgh. These prices are only good for prompt acceptance and for shipment within two or three months.

Muck Bar.—The local market is higher and we now quote best grades of muck bar made from all pig iron at $28, delivered to buyer's mill in the Pittsburgh district.

Cotton Ties.—The Carnegie Steel Company is now quoting cotton ties at 72½c. per bundle, an advance of 7½c. per bundle over the price fixed when the cotton-tie season opened.

Structural Material.—The market has quieted down a good deal, and complaint is made that in spite of the recent two advances of $1 a ton each on structural ma-

terial, fabricators are still making prices for erected work based on about 1.10c. for plain material. A good many large jobs have been held up, and the immediate outlook for the structural trade is not regarded as promising. The Cambria Steel Company has taken 800 tons of steel for a new hotel building in Johnstown. The American Bridge Company has taken some bridge work at Amsterdam, N. Y., 900 tons. The Jones & Laughlin Steel Company has taken 250 tons for a new printing building for the W. G. Johnston Company on the North Side, and the Fort Pitt Bridge Works has taken 300 tons of bridge work for the Baltimore & Ohio Railroad near Pittsburgh. Prices are reported firm, and we continue to quote beams and channels up to 15-in. for delivery this month and in September at 1.20c., while for last quarter the leading makers are quoting up to 15-in. at 1.25c., at their mills.

Plates.—We note a sale of 1000 tons of open-hearth sheared plates at 1.20c., f.o.b. maker's mill. The plate mills report specifications very heavy on orders booked at the 1.10c. basis as customers know that if they do not specify the orders will be canceled. All the larger plate mills have notified their selling agents not to take any new contracts for plates before submitting them to the home offices for action. The current demand is duller than it has been at any time for three or four months, due to the falling off in orders for steel cars and other causes, but the plate makers are wary as to what may happen in the near future, and are holding prices firmly. No new car orders have been placed, but it is expected that the Cincinnati, Hamilton & Dayton will place 1000 box and 1500 steel hopper cars before this month is closed. The inquiry of the Southern Pacific for 4600 miscellaneous cars, which was withdrawn about two weeks ago, is said to be up again. We quote ¼-in. and heavier plates at 1.20c. for delivery this and next month, and 1.25c. for last quarter. Only a few small orders have been placed at the 1.20c. price, as consumers are pretty well covered for August and September at lower figures.

Steel Rails.—It is said the Baltimore & Ohio will place 15,000 tons of rails in the near future. The Cambria Steel Company has taken 6000 tons of rails for an Eastern road. The new demand for light rails is fair, but from some of the coal-mining companies has fallen off very much. The contract for 60,000 pairs of splice bars for the Pennsylvania Lines West of Pittsburgh was divided about equally between the Carnegie and Illinois steel companies. Prices on light rails have been advanced about $1 per ton, in sympathy with the generally higher market on finished material. We now quote standard sections of Bessemer steel at 1.25c. and open-hearth, 1.34c. We quote light rails, rolled from billets, as follows: 25, 30, 35, 40 and 45-lb. sections at 1.15c.; 16 and 20-lb., 1.20c.; 12 and 14-lb., 1.25c., and 8 and 10-lb., 1.30c., in carload lots, f.o.b. Pittsburgh. Rerolled light rails are being quoted at $1 and $2 a ton less than the above prices.

Steel Wheels.—While no large orders for steel wheels have lately been placed, prices have been advanced about 50c. per ton. We quote 33-in. engine-truck forged steel wheels at $22.50 to $24.50; 36-in., $23.50 to $25.50; 33-in. tender wheels, $18.50 to $19; 36-in. passenger-train car and tender wheels, $20.50 to $21, and 33-in. freight-car wheels at $16 to $16.50, all f.o.b. Pittsburgh.

Skelp.—There is very little new demand, as the pipe mills have had a decided falling off in new orders, but prices on skelp are very firm, some makers asking an advance of $1 a ton. We quote: Grooved steel skelp, 1.20c.; sheared steel skelp, 1.25c.; grooved iron skelp, 1.55c.; sheared iron skelp, 1.65c., delivered to consumers' mills in the Pittsburgh district.

Iron and Steel Bars.—While the new demand for both iron and steel bars is only fair and for small lots, consumers covered their needs late in June and in early July through third quarter on the basis of about 1.10c. for steel bars, and specifications against these contracts are heavy. All the makers of steel bars are now holding firm to 1.20c. for this month and September delivery, and 1.25c. for last quarter. Prices on common iron bars are slightly higher and the demand is larger. The steel-bar mills are pretty well fixed with specifications for this and next month, and some bars have been sold for last quarter at 1.25c. at mill. We quote steel bars at 1.20c., maker's mill, for this and September shipment, and 1.25c. for last quarter. We quote common iron bars, made from scrap and muck bar, at 1.20c., f.o.b. maker's mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¾-in. and over, $1; ½ to 11/16-in., $1.50; under ½-in., $2.50 per net ton. These extras are not always observed.

Wire Rods.—In sympathy with the advance of $1 a ton in wire products just made by two large mills, prices on rods are slightly higher, but the new demand is dull. We now quote Bessemer, open-hearth and chain rods at $25, f.o.b. maker's mill, Pittsburgh. Mills report that specifications against contracts for rods are heavier than for some time.

Hoops and Bands.—Most consumers are well covered for this and next month on the basis of about 1.10c. for steel bands and 1.20c. for steel hoops, and specifications against these contracts are coming in freely. There have been some small orders placed for bands at 1.15c. and 1.20c. and on steel hoops at 1.30c for delivery over the remainder of this year. We quote steel bands at 1.20c., for this and next month's shipment, with extras as per the steel bar card, and steel hoops at 1.30c., for delivery over remainder of the year.

Sheets.—Last week specifications received by the American Sheet & Tin Plate Company for sheets and tin plate were the heaviest in any one week for over 18 months. All mills report a notable increase in new orders and specifications, and the sheet trade is more active now than at any time since early in the year. The mills are running at a heavier rate of output, the leading interest operating this week to 78 per cent. of capacity. All the mills are quoting higher prices, and for delivery in last quarter are asking 1.45c. for blue annealed sheets; 2c. for No. 28 black, and 3c. for No. 28 galvanized. It is said some business has been taken at these prices. We now quote Nos. 9 and 10 blue annealed sheets at 1.40c. for this month and September shipment and 1.45c. for last quarter; No. 28 Bessemer black, 1.90c. for August and September and 2c. for last quarter; No. 28 galvanized, 2.90c. for this and next month delivery, and 3c. for last quarter. We quote No. 28 black plate, tin mill sizes, H. R. and A., 1.95c.; Nos. 29 and 30, 2c. The above prices are for carload and larger lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—Advices are that there has been a slight increase in the visible supply of pig tin and that it can be obtained this week at lower prices than were asked in New York last week. All prices on tin plate have been withdrawn, and quotations are made only on actual inquiries. One leading maker is quoting $3.50 to $3.60 and has made sales at $3.40, but now refuses to name that price. Another interest is holding tin plate at $3.60 for this and next month shipment, and $3.75 for last quarter. We quote 100-lb. 14 x 20 coke and terne plates at $3.50 to $3.60 for prompt delivery and $3.75 for last quarter shipment. Some mills are refusing to accept business for last quarter at $3.75 and are declining to quote.

Shafting.—The market is very firm, one maker reported as refusing to shade 65 per cent. off in carload and larger lots. The new demand is dull, but, owing to the uncertainty as to the cost of raw materials in the near future, shafting makers are very firm as to prices. We quote cold-rolled shafting at 65 to 66 per cent. off in carload and larger lots, delivered in base territory.

Spikes.—Railroads that have contracts for spikes placed some time ago are sending in specifications freely, probably fearing that if they delay specifying they will not be able to get spikes when they are needed. The new demand is quiet, but prices are firm. We quote standard sizes of railroad and boat spikes at $1.45 to $1.50, and small railroad and boat spikes at $1.55 to $1.60 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Merchant Steel.—The new demand is better than for some months and mills report that specifications against contracts are coming in freely. Consumers who placed contracts some time ago are afraid if they hold off specifying they will not be able to get the steel when needed, and shipments by the mills are heavier than for a long time. Prices are firm, one or two mills asking advances of $1 to $2 a ton. Minimum prices on small lots are as follows: Iron finished tire, ½ x1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wire Products.—On Monday, August 17, the Youngstown Sheet & Tube Company and another wire interest advanced prices $1 per ton, or to the basis of $1.60 per keg for wire nails and $1.40 for plain annealed wire. As yet the American Steel & Wire Company and the Jones & Laughlin Steel Company have not advanced prices, but may do so before the week is out. The new demand for wire and wire nails is better and specifications against contracts are heavy. Jobbers and consumers evidently believe the chances for the market to go higher are good, and they are specifying on contracts placed on the $1.50 basis for wire nails and $1.30 for plain annealed wire very freely. The market is firm. On new orders we quote wire nails at $1.55 to $1.60; plain annealed wire, $1.35 to $1.40; galvanized barb wire and fence staples, $1.95 to $2; painted barb wire, $1.55 to $1.60, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms 30 days net, less 2 per cent. for cash in 10 days. We quote steel cut nails at $1.60, f.o.b. Pittsburgh, in carload lots.

Nuts, Bolts and Rivets.—In sympathy with other lines of finished materials, prices on nuts, bolts and rivets are strong, with indications that the market will be higher in the very near future. All shading in discounts has disappeared and some makers are asking $1 a ton advance. Specifications against contracts placed in June and early July are heavier, as jobbers and consumers evidently believe that prices will be higher in the near future and that on any contracts not specified for the material will be canceled. We quote buttonhead structural rivets in carload lots at 1.55c. and on small lots, 1.65c.; conehead boiler rivets, 1.65c. in carload lots, and 1.70c. in small lots; terms, 30 days net, 2 per cent. off for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blank and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.P.C. and r sq. nuts, blank and tapped	$6.00 off list
Hexagon nuts, ⅝ in. and larger	$7.20 off list
Hexagon nuts, smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$6.90 off list
Semi-fin. hex. nuts, ½ in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Standard Pipe.—The new demand for merchant pipe is keeping up fairly well, but new business in casing and general oil-well supplies has dropped off very much, drilling all over the country having been largely suspended owing to the shutting off of export shipments of oil. It is claimed that fully 50 per cent. of all the oil produced in this country is exported. No large oil or gas lines are in the market at present. Discounts on iron and steel pipe are firmly held.

Boiler Tubes.—The new demand for merchant and locomotive tubes is reported a little better, local mills having received some nice specifications in the past week. Discounts are still more or less shaded, depending on the order.

Old Material.—The local market is dull and prices on several grades of scrap are lower. A leading consumer of compressed side and end sheet scrap is out of the market and this has caused a large increase in the supply, and with very little new demand the price has gone off about $1 a ton. Prices on selected heavy steel melting scrap and on turnings are slightly lower. A local consumer bought about 400 tons of heavy steel melting scrap last week at about $11.25 delivered, but this is under the market, as the scrap had to be moved. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight, as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$11.50 to $11.75
Ordinary steel melting scrap	11.25 to 11.50
Compressed side and end sheet scrap	10.00 to 10.25
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.25 to 8.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to 13.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.25 to 14.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	11.25 to 11.50

†Shipping point.

Coke.—The local market is stagnant. There is no new inquiry for blast-furnace coke, either for prompt shipment or on contracts for delivery over remainder of this year. Best grades of furnace coke for spot shipment are held at $1.70 to $1.75 and for delivery over remainder of the year from $1.75 to $1.85 per net ton at oven. Standard makes of 72-hr. foundry coke are selling at $2.15 to $2.25 for prompt shipment, and on contracts from $2.35 to $2.50. The Connellsville Courier gives the output of coke in the upper and lower Connellsville regions for the week ended August 8 as 264,070 net tons. A decrease over the previous week of 5505 tons. The H. C. Frick Coke Company has recently started about 400 coke ovens to supply coke for blast furnaces recently started by the Carnegie Steel Company, but a number of merchant ovens have been blown out, so that production has not changed much.

Chicago

CHICAGO, ILL., August 18, 1914.

Restrictions in business are still commanding the place of first importance in market circles. In many directions business has suffered from cancellations directly traceable to the loss of European markets, while it is still too early to estimate what new business may be expected from other sources with which to offset the losses already sustained. The general level of business activity is accordingly somewhat lower, although this decline is more noticeable in the bookings of foundries, machine shops and general manufacturing plants than at the steel mills. Specifications for the lighter classes of material, including bars, sheets and light plates, have been very fair. Orders for sheets have been taken by a local mill sufficient to carry it through the remainder of the year and prices have been advanced an additional $2 per ton. Mill deliveries have now spread out so that demand from jobbers' stocks has assumed substantial proportions, accompanied by an advance in store prices of $2 per ton. The heavier lines have felt more severely the conservatism prevailing, with the result that not only have orders been light but specifi-

cations have in some instances been canceled or delayed. This is true of structural shapes and rails, although during the week some new rail tonnage was placed and a considerable quantity of track fastenings. The pig-iron and scrap markets have lost interest for buyers, and trading is at a standstill. The market for Southern iron indicates that $10 may be done more easily. Interest in the future supply of ferromanganese is still paramount, but advices from abroad are sufficiently reassuring that some of those who have considerable stocks of the alloy on hand are now disposed to take a profit at the going prices.

Pig Iron.—Inquiry continues light and sales are correspondingly limited, although small tonnages are reported as booked from time to time. Furnaces find shipments going forward without encountering much of a disposition to hold up deliveries, but a canvass of foundries in a number of localities shows that they have had an unusually large number of cancellations in the past few weeks and in general are far from busy. While the price of ferromanganese is still soaring in the neighborhood of 8c. per lb. it now seems that the advance is due more to a feeling of panic than to the pressure of any actual and immediate shortage. Local consumers are advised by foreign producers that they expect soon to be able to make shipment of the alloy now due upon the establishment by the consumer of a credit in London sufficient to cover its price plus an additional charge of about 10s. ($2.43) to cover insurance and higher freight rates. This doubtless represents an optimistic view as to resumption of shipping. Pig-iron prices are unchanged except for an increased prevalence of quotations on the basis of $10, Birmingham, for Southern iron. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	14.50 to 15.00
Northern coke foundry, No. 2	13.75 to 14.25
Northern coke foundry, No. 3	13.50 to 14.00
Southern coke, No. 1 f'dry and 1 soft	14.85 to 15.10
Southern coke, No. 2 f'dry and 2 soft	14.35 to 14.60
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	17.00
Basic	13.25 to 13.50
Low phosphorus	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—Railroad buying in general has fallen off rather sharply, not only as regards inquiry and matters under negotiation but even to the extent of holding up specifications already placed. In interesting contrast are the uninterrupted purchases of the Pennsylvania and Baltimore & Ohio railroads which were buyers of a large supply of track fasteners. The Duluth, South Shore & Atlantic bought rails last week. The demand for spikes and bolts has been such as to inject some firmness into the attitude of producers of these materials. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $25.50 to $26, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Of the contracts closed last week for fabricated steel none exceeded 350 tons, and the aggregate reported totaled only 1300 tons. Included among these contracts were 238 tons for a local railroad to the Chicago Bridge & Iron Company; 103 tons for the Wakefield Iron Company, Wakefield, Mich., to the Worden-Allen Company, which also took 123 tons for the Elks Building at Dubuque; 128 tons for the Chicago, Milwaukee & St. Paul to the Wisconsin Bridge & Iron Company; 273 tons for county bridges in Oregon to the Milwaukee Bridge Company; 125 tons for a bridge near Waterford, Cal., to the American Bridge Company and 348 tons for a bank building at Sioux Falls, S. D., to the Modern Steel Structural Company. Curtailment of business as the result of the present disturbed condition has been more noticeable with respect to the heavier forms of steel, including structural shapes, than it has to the lighter materials which go into more general use. Structural specifications have declined somewhat, but the recent advances in price are being adhered to uniformly. Quotations are generally limited to third quarter, though some business has been considered for fourth quarter delivery on the basis of 1.25c., Pittsburgh. We quote for Chicago delivery of plain material on new orders 1.38c.

Orders for structural material from stock show little change but are hardly in as great demand as some of the lighter lines. We continue to quote for Chicago delivery from jobber's stock 1.75c.

Plates.—The influence of events during the last 10 days presents a noticeable contrast in its effect upon light and heavy plates. Of the former there is a fair amount of business, but for the latter the demand appears to have fallen off materially, indicating that where financial considerations are involved business is being retarded. It is reported that the car inquiry from the Cincinnati, Hamilton & Dayton is to be closed this week. Reports of other car buying are much less favorable. We quote for Chicago delivery from mill for new business 1.38c.

For plates out of store we quote for Chicago delivery 1.75c.

Sheets.—The steady and very satisfactory demand for the lighter materials has been no more pronounced than with respect to sheets, and local mills appear to be fairly well sold up for the remainder of the year. Another advance of $1 a ton was announced at the end of the week and the mills appear to be conceding nothing from this basis. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.63c.; No. 28 black, 2.18c.; No. 28 galvanized, 3.18c.

The heavy bookings of sheets by the mills followed by a slowing up of deliveries brought a considerable increase of buying out of store. In view of these sales and the general situation, store prices have been advanced $2 a ton and we quote for Chicago delivery from jobbers' stock as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—Steel bar specifications continue fairly good and there has been no apparent slump. Bar-iron prices have not yet been advanced although minimum quotations are made less frequently in sympathy with the general upward tendency of the market. We quote for mill shipments as follows: Bar iron, 1.07½c. to 1.10c.; soft steel bars, 1.38c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—With the major portion of contracting out of the way, somewhat higher prices appear to be obtaining for new business that is offered. However, there is not enough new business to support a very strong position for the makers. We quote from mill as follows: Carriage bolts up to ⅜ x 6 in., rolled thread, 85; cut thread, 80-5; larger sizes, 80; machine bolts up to ⅜ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ½ to ¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅜ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Wire Products.—Producers' reports indicate very substantial bookings of wire products in all forms. Wire nails in particular seem to have picked up from the prolonged dullness which prevailed earlier in the year. Manufacturers quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.53; wire nails, $1.73; painted barb wire, $1.73; galvanized, $2.13; polished staples, $1.83; galvanized, $2.23, all Chicago.

Cast-Iron Pipe.—The placing of the 5000 tons of pipe at Toledo, Ohio, which has been up for figures, now waits upon the completion of financial negotiations.

At St. Paul 500 tons was awarded to the American Pipe Company. At Knoxville, Iowa, about 1000 tons is to be purchased. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for gas pipe.

Old Material.—The scrap market is almost completely at a standstill. Melters of scrap in this market are not even considering offers regardless of price and railroad lists bring out comparatively few bids. Our quotations are largely nominal in the absence of transactions upon which exact values can be determined but there is little doubt that the market is weak at the prices quoted and reductions of 25c. a ton are possibly applicable to nearly all grades of material. Railroad offerings of scrap closing this week include 2250 tons from the St. Paul, 2000 tons from the Michigan Central, 2750 tons from the Santa Fe and 500 tons from the Frisco lines. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$12.00 to $12.50
Old steel rails, rerolling	11.50 to 11.75
Old steel rails, less than 3 ft.	10.25 to 10.50
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	11.25 to 11.50
Heavy melting steel scrap	9.75 to 10.00
Frogs, switches and guards, cut apart	9.75 to 10.00
Shoveling steel	9.25 to 9.50
Steel axle turnings	6.75 to 7.25

Per Net Ton

Iron angles and splice bars	$12.00 to $12.25
Iron arch bars and transoms	12.00 to 12.25
Steel angle bars	8.75 to 9.25
Iron car axles	16.25 to 16.75
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.50 to 9.75
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50 to 7.75
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.50 to 9.75
Stove plate and light cast scrap	8.75 to 9.00
Grate bars	8.50 to 8.75
Railroad malleable	8.75 to 9.00
Agricultural malleable	8.00 to 8.25
Pipes and flues	6.25 to 6.50

Philadelphia

PHILADELPHIA, PA., August 18, 1914.

The recent advances in finished materials have been well maintained and in the majority of cases a somewhat larger volume of business, at the higher price levels, is reported. Sales of plates and shapes have been augmented by sizeable orders from the Pacific coast. At the same time there is an undercurrent of uncertainty evident as to future business. Much depends on the European war situation, but it is believed that little in the way of iron and steel products can be expected from Germany and Belgium for some time, and that at least a share of the business that has been going to the steel trade in those countries will be turned to American makers. This is emphasized in the way that the Pacific coast trade has immediately turned to its old source of supply to meet its requirements. Canada, also an extensive importer of foreign iron and steel products, is expected to increase its purchases in this country. The freight rate decision, as to its effect on the trade in this district, has been almost totally eclipsed by the European situation. The pig-iron markets remain exceptionally dull, little important inquiry coming out. Sheets have been more active and Eastern makers have advanced prices. Billets are higher but the demand shows little improvement. Old material displays a shade more strength, heavy melting steel advancing on larger sales.

Iron Ore.—The market is quiet, furnaces having pretty generally covered for their near future needs. This is emphasized by the offering of a cargo of foreign ore in this market, without finding a buyer, except at a bargain price. A cargo of 6500 tons of Wabana ore, arriving yesterday, marks the next to the last cargo of this season's shipments to this port. So far there has been little interruption in the importations of foreign ores. Imports for the week ended August 15 comprised 5700 tons from Cuba and 6221 tons from Sweden.

Pig Iron.—Little business has been transacted during the week. Inquiries generally have been small. The most important inquiry was that of the Pennsylvania Railroad Company, covering 1500 to 3100 tons of coke foundry, silicon 1 to 1.25 per cent., and 500 to 1150 tons of Lake Superior charcoal iron for delivery over the last four months of the year. While there have been no direct advances during the week, makers show a much stronger front. Customers are taken care of, but there is little disposition to seek new business at present unremunerative prices. Under the circumstances, sales have been closely confined to small lots, with standard brands of eastern Pennsylvania No. 2 X foundry more firmly established at $14.75 to $15, and some makers holding up to $15.25, delivered here. Occasional sales at the latter price have been reported. Further instances of the blowing out of merchant furnaces are noted. The Thomas Iron Company has recently blown out its remaining active stack, Alburtis, and, it is said, for the first time in its history, has not a single furnace in blast. Sales of 500 tons of Buffalo coke malleable pig and 200 tons of No. 2 X are reported for delivery in this district at $14 furnace, offers of $13.75 having been refused. There has been an entire lack of demand for rolling-mill forge iron. Cast-iron pipe makers have been making scattered purchases. One moderate lot was sold in this district, while a Virginia pipe maker is reported to have purchased upward of 1000 tons of Virginia low-grade iron. Moderate sales of the higher grades of Virginia foundry iron continue to be made. One maker sold over 1000 tons last week, to its regular customers, at $12.50, furnace, for No. 2 X, delivery extending over the remainder of the year. The leading interest has been holding at $12.75 for last quarter shipment. There has been no demand for basic iron and quotations are nominal. Standard analysis low-phosphorus iron has advanced 50c. a ton, with moderate sales reported at $21 and $21.50 delivered here. While there has been no change in quotations generally, producers are preparing to ask higher prices, but much depends on conditions. Concessions have for the most part disappeared. The following range about represents the market for standard brands, delivered in buyers' yards in this vicinity:

Eastern Penna. No. 2 X foundry	$14.75 to $15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.30 to 15.50
Virginia No. 2 plain	15.05 to 15.25
Gray forge	13.75 to 14.00
Basic (nominal)	14.00
Standard low phosphorus	21.00 to 21.50

Ferroalloys.—The question of supply of ferromanganese is the all-absorbing topic. Some little of the foreign product is still coming in but it is practically all against contracts. No ferromanganese appears to be held in stock by merchants, and recent sales have been of resale material. Some few transactions at varying prices have been reported. One sale of 300 tons of 80 per cent. was made at $110 seaboard; other sales have been made at $120 and a 100-ton lot was sold at $140. Smaller quantities have been sold on the basis of 6 and 8c. per lb. The American Manganese Mfg. Company is offering 40 per cent. domestic ferromanganese, which it will make at Dunbar, Pa., at $75 per ton f.o.b. furnace, delivery 60 to 90 days. At present there is no regular source of supply, but the opinion prevails that shipments from England may be resumed before long. Further heavy sales of spiegeleisen have been made, one seller disposing of an aggregate of 5000 tons last week at prices ranging from $25 delivered up to $28 at furnace. The supply of 19 to 21 per cent. available this year has now been sold and but a limited tonnage of 16 to 19 per cent. can be had. The price is now $32 at furnace. An inquiry for 1500 tons of 15 to 21 per cent., for early delivery, is before the trade. Supplies of ferromanganese on hand at steel mills vary greatly; some have enough to last from 4 to 6 months, while others have but 6 weeks' supply. There is practically no change in the ferrosilicon

market. Imports of ferromanganese at this port last week totalled 280 tons, arriving from England.

Bars.—Steel bars remain strong at 1.35c. delivered here, but buying has not been active. Specifications on contracts continue good. Makers of iron bars report a somewhat better volume of business last week, largely at unchanged prices. With prices of steel bars advancing, producers of iron bars take a more favorable view of the situation. Common iron bars are comparatively firm at 1.15c. to 1.20c. delivered here.

Plates.—Makers are encouraged by the influx of Pacific coast business. Several Eastern mills have taken orders in lots of upward of 1500 tons for early delivery at the 1.20c., Pittsburgh, base, or 1.35c. here. Miscellaneous business has also been in better volume. Orders recently have been heavier individually as well as more numerous. An order for 600 tons of ship plates is noted. Plate makers continue to resist consumers' efforts to contract for extended shipment, confining deliveries, whenever possible, to the remainder of the third quarter. Mill operations have been on a better basis; in instances, last week, full capacity was touched. Prices are firm at 1.35c. here for tonnage business and 1.40c. for small lots.

Structural Material.—Current small orders still drag, but mills have received some very satisfactory orders for shapes for shipment to the Pacific coast. One Eastern mill received upward of 4000 tons for such delivery at the 1.20c., Pittsburgh, base, equal to 1.35c. here, which price is now being held as minimum. Specifications on contracts have been comparatively good and mill activities have been maintained. Some small bridge work has come out, and the contract for the inspection building at Paoli, Pa., for the Pennsylvania Railroad has been placed, involving some 300 tons. Few large propositions are before the trade. Prices are firm at 1.35c. here for tonnage business in plain shapes and 1.40c. for odd lots.

Billets.—The leading Eastern billet maker has advanced the price of basic open-hearth rolling billets to $23.40 delivered here, with forging billets ranging from $4 to $5 over rolling steel, depending on specifications. There has been little new demand for either class of billets, but on small orders the above prices rule. Mill operations continue on a restricted basis.

Sheets.—The demand for sheets continues good and Eastern mills are running at practically full capacity. New inquiry has been good. Consumers would contract freely at the old price basis but makers are holding firmly at 1.60c. to 1.65c. here, for No. 10 blue annealed sheets, subject to early delivery.

Old Material.—Larger sales of heavy melting steel scrap have somewhat strengthened the general market. Some few other grades have also been in better demand. The advance in prices of finished materials have also tended toward strengthening the market. A number of 1000-ton lots of heavy melting steel scrap have been taken at $11, delivered, although some mills refuse to pay over $10.50. Old steel axles have been in better demand. Carwheels brought $11, and wrought pipe shows an upward movement. Here and there rolling mills are beginning to manifest more interest in the market. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania, and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$10.50 to $11.00
Old steel rails, rerolling	12.00 to 12.50
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	14.75 to 15.25
Old iron axles (nominal)	20.00 to 21.00
Old iron rails	14.00 to 14.50
Old carwheels	11.50 to 11.75
No. 1 railroad wrought	12.25 to 12.75
Wrought-iron pipe	10.00 to 10.50
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Wrought turnings	8.00 to 8.50
Cast borings	8.50 to 9.00
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.00 to 8.50
Stove plate	8.25 to 8.75
Railroad malleable	9.00 to 9.50

Coke.—The market for furnace coke has been less active. The demand is light and prices have a weaker appearance. Quotations for standard furnace coke range from $1.70 to $1.85 per net ton at oven. Occasional good contracts for foundry coke are noted but the demand has not been active. Sales of 3000 and 1000 tons for delivery over a year are noted. Prices of standard foundry coke range from $2.40 to $2.75 per net ton, at oven, but prompt coke may be had down to $2.25.

Buffalo

BUFFALO, N. Y., August 18, 1914.

Pig Iron.—New orders are slack but shipments on old contracts are going out in good volume. Most producers report inquiry as very light. There is still quite a wide divergence in sellers' price views. Some on account of their being pretty heavily sold are asking $14 to $14.25 for small lot business in 2 X and malleable. One producing interest advises it is practically out of the market except at $14 minimum for any other than "off grade" iron. One of the larger tonnage lots mentioned above, 2 X foundry, was booked at $14 at furnace. Another producer is quoting considerably under these figures; but with $13 at furnace as the minimum for any grade none of the furnaces of the district seems to be interested in selling iron for delivery beyond January 1. Certain grades of charcoal iron are almost impossible to obtain and there is a growing scarcity of some qualities on the lower lakes. Canadian ordering in pig iron is at a complete standstill. We quote as follows, f.o.b. furnace, last half delivery:

No. 1 foundry	$13.50 to $14.25
No. 2 X foundry	13.00 to 14.00
No. 2 plain	13.00 to 13.75
No. 3 foundry	13.00 to 13.50
Gray forge	12.75 to 13.25
Malleable	13.50 to 14.25
Basic	14.00 to 14.25
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Old Material.—The feeling of uncertainty as to the effect of the war on the market that prevailed last week still continues. Dealers selling prices are unchanged from last week and are firmly held. We quote per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$10.25 to $10.50
Low phosphorus steel	14.00 to 14.50
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.50 to 13.00
Old iron axles	19.50 to 20.00
Old carwheels	11.00 to 11.50
Railroad malleable	9.25 to 9.75
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	13.00 to 13.75
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	9.00 to 9.75
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Finished Iron and Steel.—Miscellaneous inquiries have been a little better and specifications have been of very good volume. The principal activity has been in bars and structural material rather than in plates, although the price of the latter is firm. The governing price to-day for steel bars, shapes and plates is 1.20c. base for immediate specification on desirable orders—with a strong tendency toward increasing to 1.25c. The latter price is now being quoted by many agencies on the less desirable business for current delivery. Few contracts are being made for future delivery but such as are taken for fourth quarter are at 1.25c. The market in wire and wire products is very strong and locally reflects the advancing tendency of the general market. One local agency of an independent interest reports the price again advanced this week to $1.40 base for wire and $1.60 base for nails. Standard spikes are now being sold at $1.60 base, with small railroad spikes and bolts $1 per ton advance over base price. The only signs of revival in Canadian demand are from agricultural implement makers. The Corrugated Bar Company has contract for 100 tons reinforcing bars for

the Buffalo Shirt Company's factory. Bids go in to-day on 250 tons steel for the Church of the Transfiguration, Buffalo, and this week on 200 tons for public school 66, Buffalo. Bids will soon be taken for 200 tons for the Infants Home and Maternity Hospital, Church of Our Lady of Victory, South Buffalo. The Penn Bridge Company, Beaver Falls, Pa., was low bidder for 1000 tons for a bridge over the Genesee River, Charlotte, N. Y. Chas. F. Ernst & Sons Company, Buffalo, has 120 tons for the Jubilee Library, Buffalo, and the Hamilton Bridge Company 1200 tons for the United Hotel Company, Hamilton, Ont.

Cleveland

CLEVELAND, OHIO, August 18, 1914.

Iron Ore.—The greater interest in the Lake Superior ore market, which was noted in last week's report, is now being translated into orders. These orders so far are for comparatively small quantities, ranging from 5000 to 10,000 tons each and for rather early delivery. It is still believed that the August shipments will be the heaviest for any month of the present season but "wild carriers" have not had a great deal to do so far this season. We quote prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—Small lot sales appear to be the rule in this market—from 50 to 100 tons—mostly for prompt delivery. Some Cleveland furnace companies state that shipments from their furnaces almost if not quite equal the output of these stacks. Foundry grades are in more active demand than steel-making irons for which no trace could be found for a single inquiry in the Cleveland market to-day. Foundries are taking their regular quotas of iron and the melt in general in this district appears to equal that of any time in the past four months. Low-phosphorus iron made in the valleys is being sold in small tonnages and to-day's quotation, as made by Cleveland sellers, is $21.15 to $21.40, Pittsburgh. We quote, delivered Cleveland, as follows:

Bessemer	$14.90
Basic	$13.75 to 13.90
Northern No. 2 foundry	13.75
Southern No. 2 foundry	14.60
Gray forge	13.25
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.25

Coke.—Sellers of Connellsville coke state that consumers are manifesting little interest in the market. Sales of prompt furnace coke are few, and what is being sold is bringing the usual price of $1.70 to $1.75 per net ton at oven. Foundries are buying their fuel in one and two carload lots. There is a little movement of foundry grades in this market, usually at $2.50 at oven, for strictly standard Connellsville grades, but some foundries are getting coke at the minimum of $2.35. Occasionally a foundry will offer to close on a contract for several months ahead but such offers are quite infrequent.

Finished Iron and Steel.—Local interest in finished steel lines the past week has centered around the advances announced both by wire makers and sheet mills. The announcement of the Youngstown Sheet & Tube Company of its advance of $1 a ton in all lines of wire products, effective August 17, was not entirely unexpected, since an intimation of such action had been given a week ago. Most wire makers have followed with an advance, but the American Steel & Wire Company has not done so as yet. The Youngstown Company at the same time lowered its discount on woven wire fencing one-half point, being an advance of about 75c. a ton. Eastern Ohio sheet makers have been putting up their prices steadily $1 a ton until to-day these quotations prevail: Blue annealed No. 10, $1.40 to $1.45, Pittsburgh; No. 28, black, $1.95 to $2; No. 28, galvanized, $2.90 to $3. These mills report inquiry quite active and their books fairly well filled with business extending in some instances over a period of four to six weeks. The new quotation of 1.20c., Pittsburgh, on plates, shapes and bars, is being obtained for some small lots by all sellers represented in this city, but it is believed confidently that the 1.15c. price has not disappeared entirely in the Cleveland district, this being especially true of plates. The Lackawanna Steel Company has taken 500 tons of standard steel rails from the Clover Leaf Railroad, and the Carnegie Steel Company has taken about the same tonnage. The city of Cleveland is beginning excavation for a sewage disposal plant near Willow, Ohio, contracts for the steel and equipment for which are yet to be let. Plans have been presented to City Council by the Nickel Plate Railroad, which contemplates the expenditure of $400,000 within the city limits on roadbed, etc., of which $100,000 will be invested in a warehouse. Municipal plans for additional grade elimination work proposed the past few days to be started within one year provide for total expenditures by the railroads and the city of about $4,000,000. The Lackawanna Steel Company has taken 500 tons of sheet piling for the Crowell-Lundoff-Little Company, general contractor for the warehouse for the W. Bingham Company, this city.

Nuts and Bolts.—Continued activity in demand is reported by makers of nuts, bolts and rivets, and growing firmness in prices is reported. Shipments continue good and shops report fairly satisfactory conditions of order books. We quote discounts as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, $6.30 off; hexagon h. p. nuts, blank or tapped, $7.20 off; c. p. c. and t. square nuts, blank or tapped, $6 off; hexagon, ⅝ in. and larger, $7.20 off; 9/16 in. and smaller, $7.80 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—Dealers are finding inquiries for both iron and steel scrap quite scanty and mills are seemingly not anxious to accumulate tonnages on their yards. The Otis Steel Company, it is said, is taking no material at this time, and the Upson Nut Company is receiving only a few cars a week. Cleveland rolling mills are working intermittently. All of this tends to leave the local scrap market dull and uninteresting. Quotations generally are unchanged. We quote, f.o.b. Cleveland, as follows:

	Per Gross Ton	
Old steel rails, rerolling	$11.50 to	$12.00
Old iron rails	13.00 to	13.50
Steel car axles	15.00 to	15.25
Heavy melting steel	10.00 to	10.50
Old carwheels	11.25 to	11.50
Relaying rails, 50 lb. and over	23.00 to	25.00
Agricultural malleable	8.50 to	9.00
Railroad malleable	10.25 to	10.75
Light bundled sheet scrap	7.50 to	8.00
	Per Net Ton	
Iron car axles	$17.00 to	$17.25
Cast borings	5.75 to	6.00
Iron and steel turnings and drillings	5.25 to	5.50
Steel axle turnings	6.75 to	7.25
No. 1 busheling, new	8.25 to	8.50
No. 1 busheling, old		8.25
No. 1 railroad wrought	9.50 to	10.00
No. 1 cast	10.50 to	10.75
Stove plate	7.50 to	8.00

Cincinnati

CINCINNATI, OHIO, August 19, 1914.—*(By Wire.)*

Pig Iron.—A small lot of Northern foundry was sold locally for shipment this year, and there is a reported sale of Southern foundry to a nearby consumer. A southern Indiana melter bought 600 tons of Southern grades. With the exception of these sales all business now is of a minor character. The largest general inquiry is from central Ohio for about 700 tons of mixed Northern and Southern foundry grades. The foundry melt in this vicinity is decreasing, with the exception of the stove makers, who are using about the normal quantity of iron. Southern iron producers are making an effort to advance quotations, and while there is yet ten-dollar iron on the market for any shipment this year it is not such a general quotation, a few firms having added 25c. to 50c. a ton to their prices. Northern No. 2 foundry is now obtainable at $13, Ironton, but both basic and malleable are unchanged at previous quotations.

The rolling mills are not taking any interest in the situation and are content to await developments before providing for the future. They are understood to have a supply under contract sufficient to run them into the first quarter of next year. Malleable users are also slow, and there is no business in this territory under negotiation. The market is a waiting one as far as both buyer and seller are concerned, and there are no indications of revival at an early date. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$13.75 to $14.25
Southern coke, No. 2 f'dry and 2 soft	13.25 to 13.75
Southern coke, No. 3 foundry	12.75 to 13.25
Southern No. 4 foundry	12.25 to 12.75
Southern gray forge	11.75 to 12.25
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.20 to 15.70
Southern Ohio coke, No. 2	14.20 to 14.70
Southern Ohio coke, No. 3	13.95 to 14.20
Southern Ohio malleable Bessemer	14.45 to 14.95
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—There is no new inquiry for either furnace or foundry coke in this market. Some coke for domestic uses is being sold, but quantities involved are confined to carload lots. There are few complaints regarding shipments being held up, as both the producers and their agents have discounted the future, and the market for the next 30 days will be doubtless a waiting one with all interests. We quote Connellsville 48-hr. brands around $1.75 to $1.90 per net ton at oven, for nearby shipment, but contract business is not solicited below $1.90 to $2 for the best grades. Pocahontas and Wise County producers are asking from 10c. to 25c. a ton more. Foundry coke is quoted from $2.25 to $2.50 per net ton at oven in all three fields.

Finished Material.—There seems to be a better demand for sheets, both black and galvanized, from different sources, and it cannot be denied that prices are much firmer. The mills of this vicinity are quoting No. 28 black sheets at 2c., Pittsburgh basis, and galvanized sheets 3c., making the Cincinnati quotations 2.15c. and 3.15c. respectively. Although there has been an advance in mill prices on steel bars and structural shapes, the local store quotations remain around 1.80c. to 1.85c. Very little business is being transacted in any of these lines.

Old Material.—The slackness in the demand from all sources has not affected quotations. Transactions now are practically limited to small lots of scrap iron that are needed by foundries and other users who must have different grades for special mixtures. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum quotations are dealers' quotations, f.o.b. at yards:

Per Gross Ton	
Bundled sheet scrap	$6.75 to $7.25
Old iron rails	11.75 to 12.25
Relaying rails, 50 lb. and up	19.75 to 20.25
Recolling steel rails	10.75 to 11.25
Melting steel rails	9.25 to 9.75
Old carwheels	10.25 to 10.75
Per Net Ton	
No. 1 railroad wrought	$8.75 to $9.25
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.25
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	10.25 to 11.25
Burnt scrap	6.00 to 6.75
Old iron axles	15.50 to 16.00
Locomotive tires (smooth inside)	9.75 to 10.25
Pipes and flues	6.25 to 6.75
Malleable and steel scrap	7.25 to 7.75
Railroad tank and sheet scrap	5.25 to 5.75

Boston

BOSTON, MASS., August 18, 1914.

Old Material.—Dealers report little change this week. While prices have not advanced, the market is enough stronger that an upward movement is looked for in the near future. Transactions are light, but more scrap is moving than a month ago. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.25 to $8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	13.25 to 13.75
Old iron axles	21.25 to 21.75
Mixed shafting	12.00 to 12.25
No. 1 wrought and soft steel	9.00 to 9.25
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.50 to 7.75
Cotton ties (bundled)	6.00 to 6.25
No. 2 light	3.75 to 4.25
Wrought turnings	5.00 to 5.50
Cast borings	5.25 to 5.75
Machinery cast	11.25 to 11.50
Malleable	8.00 to 8.25
Stove plate	7.75 to 8.00
Grate bars	5.25 to 5.50
Cast-iron carwheels	11.00 to 11.25

Birmingham

BIRMINGHAM, ALA., August 17, 1914.

Pig Iron.—The price of iron in this district ranges from $10 to $10.50 for No. 2 foundry, with the major portion of the business going at $10 to $10.25. The highest price, but with few sales, is asked by an interest which is well booked for the remainder of the year and is short on some grades. The lowest price is admittedly made by one large interest, probably by one other, and by Tennessee makers, with northern Alabama iron going in all likelihood at the same figure. The largest and most diversified business of the week is reported by a company which claims to have sold nothing under $10.25. During two days of the past week this concern sold 4000 tons into Chicago territory at that figure and has recently entered St. Louis, New England, Cincinnati and Philadelphia with very respectable contracts, all, it is claimed, on the $10.25 basis. On the other hand, lots of 1000 tons have been sold in Southern territory at $10 and it is understood that quite a large business has been done around that figure. The Tennessee Coal, Iron & Railroad Company has blown out its last active Bessemer stack and has only seven furnaces in operation—six at Ensley and one at Oxmoor—all, it is understood, being on basic iron. It develops that the total decrease of 200,000 tons in the first seven months' production of pig iron in Alabama was in non-merchant iron. Steel mills now, however, are much more active than they have been. The Ensley rail mill is operating in full, as is the Gulf States Steel Company's plant at Gadsden. The Woodward Iron Company has blown in another stack and now has a producing capacity of 1000 tons a day. We quote, per gross ton, f.o.b. Birmingham furnaces, as follows:

No. 1 foundry and soft	$10.50 to $11.00
No. 2 foundry and soft	10.00 to 10.50
No. 3 foundry	9.50 to 10.00
No. 4 foundry	9.25 to 9.75
Gray forge	9.00 to 9.50
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—The leading water pipe interest is working on an order for the Panama Canal and all factories appear to have a good supply of orders on hand with prospect of an increase in the export demand. Sanitary pipe appears to be quiet. There has been no change in prices. We quote, per net ton, f.o.b. yards, as follows: 4-in., $20.50; 6-in., $18.50, with $1 added for gas pipe.

Coal and Coke.—Some bunker coal trade has been temporarily lost owing to the stoppage of shipping, incident to the European war, but otherwise it has become accentuated with the approach of autumn. However, domestic yards are taking on stocks less liberally than they did last year. The railroad contracts in the aggregate are larger than they have been heretofore. Coke is stronger than it has been in some time and there is a ready sale of the output. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, $2.75 to $3; foundry, $3.50 to $3.75.

Old Material.—Dealers report a brisker business since the steel mills became busier, but transactions

are still not large. Total sales for the week were about 1500 tons, principally in the lighter grades. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., August 17, 1914.

Pig Iron.—Melters are taking only what is needed at the moment. Orders to hold up shipments have been those of small consequence, and traceable to repair work. There is a growing tendency to mark up prices and to withdraw prices for deferred deliveries. For the most part figures of the moment are for August and September delivery. Ferromanganese and spiegeleisen are both centers of interest and the former is quoted as high as $150 per ton.

Coke.—The only inquiry of moment is for 6000 tons of furnace coke, 500 tons per month for 12 months, and this is being closely figured on. It may close this week. By-product coke is $5.10 to $5.20, delivered, St. Louis.

Finished Iron and Steel.—An increase in new business is reported over the same period a year ago. Buyers evince no desire to stay out of the market on account of the price advance, but rather wait a more definite state of affairs before entering upon commitments. Specifications on contracts are quite liberal all things considered. The 17,000-ton structural contract for the Kansas City Terminal is still held up pending more stability in the financial situation.

Old Material.—The scrap market, despite the fact that mills are disinclined to buy, is maintaining firmness, and dealers believe that there will be increased buying shortly with greater mill activity early in September. Lists out, quoted for St. Louis delivery, include the Union Pacific, 1500 tons; Frisco, 500 tons; Minneapolis & St. Louis, 200 tons; Minneapolis & Omaha, 700 tons, and the Missouri, Kansas & Texas, 1000 tons. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton

Old iron rails	$11.00 to $11.25
Old steel rails, rerolling	11.25 to 11.50
Old steel rails, less than 3 ft.	10.50 to 10.75
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	11.00 to 11.25
No. 1 railroad heavy melting steel scrap	10.50 to 10.75
Shoveling steel	8.00 to 8.50
Frogs, switches and guards cut apart	10.50 to 10.75
Bundled sheet scrap	5.00 to 5.25

Per Net Ton

Iron angle bars	$10.00 to $10.50
Steel angle bars	9.25 to 9.50
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	11.00 to 11.50
No. 1 railroad wrought	8.00 to 8.25
No. 2 railroad wrought	8.00 to 8.25
Railroad springs	9.25 to 9.50
Steel couplers and knuckles	9.25 to 9.50
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.75 to 8.00
Mixed borings	4.00 to 4.25
No. 1 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	5.75 to 6.25
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.25 to 8.75
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.50 to 8.00
Pipes and flues	5.75 to 6.25
Railroad sheet and tank scrap	5.75 to 6.00
Railroad grate bars	7.25 to 7.50
Machine shop turnings	5.00 to 5.25

The Star Drilling Machine Company, Akron, Ohio, has elected the following directors and officers: D. B. Duff, W. M. Dabney and A. S. McClintock, of Cleveland; J. W. Miller and G. W. Carmichael, of Akron; S. E. Duff, of Beaver, Pa., and E. B. Webb, of Alliance, Ohio. Officers elected were: D. B. Duff, president; W. M. Dabney, vice-president; J. W. Miller, treasurer and general superintendent; W. C. Miller, assistant superintendent.

San Francisco

SAN FRANCISCO, CAL., August 11, 1914.

Several factors have combined to cause a more general buying movement than has taken place for many months. The Panama Canal has cut the freight charge from New York to San Francisco to 30c. per 100 lb. on most steel products, which alone would have resulted in some business, while the war in Europe has cut off all supplies from that quarter. Supplies of domestic goods have long been kept down, and stocks of foreign steel, though widely distributed, are believed to be moderate in the aggregate. Buyers have accordingly turned to domestic mills to cover their early fall requirements, and buying is further encouraged by the upward movement of prices in this country, as well as the belief that Panama rates will not long remain at the present level. On the other hand, the disturbance of shipping and financial conditions has caused great uncertainty as to the outlook for local requirements. From all reports the buying, though general, has not been heavy. Rumors of a large movement have perhaps been based on anxiety to get material by the first steamers through Panama, which will be well loaded. Local prices are held pretty firmly up to the basis of current Pittsburgh quotations.

Bars.—Buying in this department has been as large as in any other, if not larger, with a general desire on the part of merchants and large consumers to replace their interrupted foreign shipments and to protect themselves against further advances. On the whole, however, contracting has been conservative. A fair tonnage has been taken for prompt delivery, as merchants are beginning to see the advisability of carrying somewhat larger supplies. The jobbing trade shows some improvement, and a slight general acceleration is expected for the next few months, though there has been no evident increase in current consuming requirements. Reinforcing material is rather quiet, with prices still somewhat irregular, and local mills are working on a limited scale. Soft steel bars are now held on the basis of 1.20c., Pittsburgh, though this advance is partly nullified by the Panama rate, under which bars may be brought into this harbor at about 1.67c.

Structural Material.—There has been considerable contracting for plain material, in the aggregate, in the last fortnight, but the dearth of fabricating business has prevented any very large demand. Much of the business diverted to domestic mills by the war is believed to be in small shapes for miscellaneous uses, as the amount of foreign steel taken by regular fabricating firms has been limited. Little new business is coming out, and the work in prospect includes not much of importance, though an inquiry for the University of California hospital, which will be quite a large job, is expected in about three months. Figures are being taken for a Union Iron Works building. Tehama County, Cal., has rejected bids for a jail, about a $20,000 job. Plans are under way for a large theater on Market street; a seven-story hotel at Eleventh and Franklin streets, Oakland; and several unimportant apartment jobs. Plain material for shipment is quoted here at 1.20c., Pittsburgh, and prices on shapes from store are advancing.

Rails.—While there are no large offerings of foreign light rails on the market provision has already been made for most of this season's improvements, and current business is confined to narrow limits. Some inquiries for standard sections have appeared, but little business has been closed.

Plates.—The Lacey Mfg. Company, Los Angeles, has taken the Valley Pipe Line tank contract, requiring about 2000 tons. Aside from this there is nothing of unusual importance, though there is a fair volume of miscellaneous tank and marine business, and jobbing trade shows a slight improvement. Considerable business has been booked from merchants and large consumers, both for prompt and extended delivery. Prices are now held on the basis of 1.20c., Pittsburgh.

Sheets.—Distributive business is picking up a little, and merchants are getting into the market in prepara-

tion for the usual fall demand, being encouraged by the present tone of prices. More business, in fact, is offered than can readily be placed, especially in galvanized, and it has been difficult to place contracts for future shipment. Agents for several mills are putting all inquiries up to their home offices, and it is said that orders for galvanized on the basis of 2.85c., Pittsburgh, have been turned down, with 1.85c. about the minimum on black. No. 10 blue annealed may still be had at 1.35c., Pittsburgh, though the larger mills are asking 1.40c.

Standard Pipe.—Current business is rather dull, but merchants look for a general revival in the outside consuming demand in the next two months, and are beginning to take more interest in the market. A small oil line inquiry came out recently, but was withdrawn on account of the disturbance of shipping conditions; and the general tendency among oil interests since the outbreak of the war is to retrench. Prices are unchanged.

Cast-Iron Pipe.—Since the lettings last reported, about the largest order has been 150 tons of 6 to 12 in. for Pasadena, Cal. The town of Zamboanga, in the Philippines, will take bids for about 1000 tons October 1. Prices are quoted at $32 per net ton for 6-in. and over; $34 for 4-in., and $1 extra for gas pipe.

Pig Iron.—The local situation shows little change. For the present it is impossible to ship anything from foreign ports, and there is some uncertainty of the arrival of several small shipments now afloat. Melters, however, have taken little interest in future offerings, and there was not much foreign iron under contract. There have been frequent small arrivals at all Pacific ports in the last few months, keeping fairly large stocks on hand.

Coke.—There is no large tonnage afloat, and local supplies of German Syndicate coke are not expected to last long. The price on spot offerings has accordingly been raised to $14 per net ton, and it is expected that shipments of Alabama coke will soon be required. It is figured that the latter can be brought in at about $13.50 to $14 per net ton. So far local foundries are taking little interest, though outside shipments are increasing.

Old Material.—The anticipated effects of the war and stiffening prices on finished material have caused holders of scrap to take a firmer attitude, though so far the local demand shows no improvement. Cast-iron scrap is held at about $15 to $16 per net ton, with a light but fairly steady demand from the foundries. Steel melting scrap is firmly held at $10 to $11 per gross ton, and it is difficult to find anything below those figures, though buyers are still holding off. Other lines are little more than nominal.

New York

NEW YORK, August 19, 1914.

Pig Iron.—The market is practically at a standstill. Inquiries before the trade are fewer and for smaller quantities than in many weeks. It is evident that the foundries supplied by furnaces represented in New York took care of their wants for a number of months ahead in the buying of June and July. Some shipments are being held up but the majority of melters are receiving their full quotas. Occasionally a foundry offers to buy 100 tons or 200 tons provided the price of its last previous contract is accepted. Furnaces are unwilling to duplicate their prices of some months ago, particularly in view of the attitude of manufacturers of finished steel products. The inquiry from Japan for 1000 tons of low phosphorus pig iron is still under consideration. The iron is wanted to take the place of English hematite. The specifications call for copper under 0.03 per cent, which would bar irons made from Cornwall ores. Some sales of Southern pipe iron have been put through in the East on a basis slightly above $10 Birmingham for foundry No. 2. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.75 to $15; No. 2 X, $14.35 to $14.60; No. 2 plain, $14.20 to $14.45. Southern iron is quoted at $14.75 to $15 for No. 1 and $14.25 to $14.50 for No. 2.

Ferroalloys.—Assurances as to a resumption of shipments of 80 per cent. ferromanganese from England are very uncertain. Uneasiness on the part of those steel producers who are short of the alloy does not greatly lessen though England's gradual command of the sea lends some encouragement. Further receipts of the German alloy are out of the question, and even if some English shipments are available, the supply will be considerably less than under normal conditions. It is reported that some round tonnages have recently been sold here at $110, seaboard, by representatives who were fortunate in having a small supply, but such transactions are few. Various rumors of sales at high prices are current, but such sales, if true, are confined to small lots for spot shipment. A rumored sale at $175, seaboard, is denied. Inquiries of course are plenty with offers averaging about $100, seaboard. While there are no quotations, it is said that probably $125, seaboard, is about the market for spot shipments if available. It is reported that future shipments on contracts will be subject to an additional charge of about $2.50 per ton for war risks and insurance, making the contract price about $40.50, seaboard, for the English product. This year's domestic supply of spiegeleisen, the 19 to 21 per cent. manganese grade, is said to have been all sold at $32 f.o.b. The lower grade, under 19 per cent. manganese, is now selling at $32 f.o.b., an advance since last week. When it is considered that at least four parts of spiegeleisen are required to do the same work as one part of 80 per cent. ferromanganese, the former is fully as expensive and is also harder to use. Quotations for 50 per cent. ferrosilicon are reported as unaffected thus far and they remain at $71 to $73, Pittsburgh, depending on the tonnage desired.

Finished Iron and Steel.—Prices are strong at 1.20c. Pittsburgh, specifications on contracts are good and little of the material seems to be going into stock, but new business is light. It is noted that in a number of cases contracts and even options have been extended for one and another reason, sometimes until November 1, at the recent basis of 1.15c. Pittsburgh, and attractive business in plates appears still to be going, with Eastern mills, at 1.15c. Pittsburgh. There has been more inquiry for export, but the volume has been exaggerated because of the same inquiry appearing in slightly different ways in a number of different offices. Bar iron prices appear to be stiffening, partly on account of the advance in scrap and also because there is another shift from steel bars to iron bars. The bulk of the bar iron business has within recent weeks been done at 1.25c. New York and lower, but there is a feeling that the price will shortly go up $1 a ton. One of the interesting developments is that the Gelsenkirchener Bergwerke A. G. was low bidder for 1576 tons of steel sheet piling for the Government on bids submitted at Wilmington, N. C., the unit price being about $1 or $1.50 per ton below Pittsburgh quotations. In structural contracts the Passaic Steel Company has taken the lion's share, including 600 tons for an apartment for the Princeton Construction Company; 700 tons for a fourth Bing & Bing apartment on Sixty-sixth street between Lexington and Third avenues, and 750 tons for the Essie Construction Company, West End avenue and Ninety-sixth street. The W. B. Shafer Company has taken 1000 tons for the Veronica Realty Company, for a mercantile building at Sixty-first street and Central Park West. The Harris, Silvers, Baker Company has 300 tons for the Garden theatre, Baltimore; the G. A. Just Company, 1000 tons for the Ford Motor Company, Long Island City; Lewis F. Shoemaker & Co., 400 tons for the New Haven at Woodlawn, and the Hedden Iron Construction Company 250 tons for the Sherwood studio, Fifty-seventh street and Fifth avenue. The Eastern Steel Company is to supply the plain material for both the Public Service terminal in Newark and the steel for the power house in Philadelphia recently awarded. We quote mill shipments of steel bars and shapes 1.20c., Pittsburgh, or 1.36c. New York, and steel plates at 1.31c. to 1.36c., New York. We quote iron bars at 1.25c. to 1.30c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and structural material at 1.85c. to 1.90c.

Cast-Iron Pipe.—No public lettings of importance are in sight at present in this immediate territory. Pipe manufacturers, however, report private buying of about the normal character for the season. Prices show no improvement. Competition continues keen on all business now coming up, and the majority of pipe foundries are evidently finding difficulty in getting back a new dollar for an old one. Quotations on carload lots of 6-in. are continued at $20.50 to $21, per net ton, tidewater.

Old Material.—While some little movement took place in heavy melting steel scrap in the past week, dealers here are inclined to regard it as a passing episode in a dull market, as strenuous efforts fail to uncover more buyers. The slight improvement in prices noted last week is maintained, however, the general feeling being rather hopeful of a better demand from consumers in the near future. Dealers' quotations, which are largely nominal, are as follows, per gross ton, New York:

Old girder and T rails for melting	$8.00 to $8.50
Heavy melting steel scrap	8.00 to 8.50
Relaying rails	20.50 to 21.00
Rerolling rails	10.25 to 10.75
Iron car axles	17.25 to 17.75
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	10.25 to 10.75
Wrought-iron track scrap	9.00 to 9.50
No. 1 yard wrought, long	8.50 to 9.00
No. 1 yard wrought, short	8.00 to 8.50
Light iron	3.25 to 3.50
Cast borings	6.00 to 6.25
Wrought turnings	5.50 to 5.75
Wrought pipe	7.50 to 8.00
Carwheels	9.25 to 9.75
No. 1 heavy cast, broken up	10.00 to 10.50
Stove plate	7.50 to 8.00
Locomotive grate bars	6.00 to 6.25
Malleable cast	7.25 to 7.75

American Steel for England

Sheet Bars at $24.33 New York—Ferromanganese Shipments Next Week

(By Cable)

LONDON, ENGLAND, August 19, 1914.

The British steel trade expects to benefit enormously from the stoppage of production in Germany, Belgium and France. Already there has been heavy buying of semi-finished steel to replace continental material previously contracted for. Lines of 5000 to 30,000 tons of sheet bars, billets, etc., have been booked at advancing prices. Inquiries are being made by works here for American steel and independent American steel companies quote £5 ($24.33) for sheet bars f.o.b. New York, spot cash against shipment.

Pig iron is firm and makers are withdrawing quotations. Stocks are increasing but when the North Sea is declared safe exports will be partly resumed. Hematite iron is particularly strong, and steel works have bought heavily. The total number of furnaces blowing is 147 against 200 one year ago.

In ferromanganese the feeling is panicky. Makers are unwilling to take contracts and business is mostly in small lots. Quotations are nominally £12 ($58.39) f. o. b. for Europe, $100 c. i. f. for America, and £18 to £19 ($87.59 to $92.46) for Japan. Numerous inquiries have come from the United States. American consumers who have bought German ferro-manganese through London merchants and who a short time ago were deferring shipments are now much annoyed. It is impossible to supply arrears or to accept fresh ferromanganese specifications. Russian ore is unobtainable but a good deal of Indian ore sold to Germany is being diverted to England. English works have large quantities of ferromanganese to deliver up to the end of the year. Shipping facilities to America are improved and shipments to Baltimore will probably be resumed next week.

Finished iron prices have all advanced. Finished steel is firm and there is plenty of inquiry. American makers are feeling the market here in all lines. An acute scarcity of spelter cripples galvanized sheet makers. It is reported here that the United States Steel Corporation has taken a Chilean order for 10,000 tons of rails at £7 12s. 6d. ($37.13) delivered. Such quotations as are available are as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. to 13s. 6d. ($3.16 to $3.22) nominal.

Cleveland pig iron warrants (Tuesday), 52s. 11d. ($12.88).

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 52s. 3d. ($12.96).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £9 10s. ($46.22).

Steel ship plates, Scotch, delivered local yards, £6 15s. ($32.84).

Steel rails, export, f.o.b. works port, £6 12s. 6d. ($32.23).

Hematite pig iron, f.o.b. Tees, 72s. 6d. ($17.64).

Sheet bars (Welsh), £5 ($24.33), delivered, but some makers ask up to £6 ($29.20), the market being chaotic.

British Buying at Home to Replace Continental Steel—Prices Up

(By Mail)

LONDON, ENGLAND, August 7, 1914.

With mobilization in full progress, and the banks all closed for days, it will easily be understood that business here has been everywhere at a complete deadlock. Now that the bank rate has been reduced, and it is perfectly clear that the Government has the entire situation in hand and is prepared to carry everything through for the public weal (even down to arranging insurance against King's enemies' risks and fixing maximum prices for the food of the nation to avoid panic rates) a more stable feeling has come over the entire business community, and at the moment of writing, although things are very confused and there is hardly anything doing, the tendency is yet to take a calm view of the position and to make the best of things. We are awaiting with what patience we may the freeing of the high seas, in this part of the world at all events, from the warships of the enemy. Once this is accomplished, commerce can get ahead again. Already this morning the Admiralty has officially announced that the North Sea is safe, and the announcement has done much to assist public sentiment.

CONTINENTAL STEEL TO BE REPLACED AT HOME

Under the circumstances set up by war conditions, it is, of course, out of the question to execute any of the contracts entered into by British rolling mills and other works for their supply of foreign raw material. This involves, therefore, the cancellation of huge quantities of German, Belgian, and French finished and half-finished material, of which a part at least will have to be replaced by British steel. It is not to be wondered at that under these circumstances there has been a very sharp and sudden upward movement in prices of iron and steel. The closing of all markets has made it very difficult to get information, but the first result of the war has been to cause the Scottish Ironmakers' Association to advance their prices of finished iron by 10s. ($2.43) a ton, and all other makers of similar material throughout the country are expected to come into line. There is a very heavy tonnage of half-finished steel to be covered, now that European imports are out of the question, and this will benefit the Welsh and Midland steel works to a great extent. Some excitement is reported in the Midlands already, where things have been very bad for many months, and there has just been a jump in prices amounting to about 20s. a ton for angles and semi-finished products. The Welsh prices are not altered so far, but it is not likely that they will remain unmoved when other markets declare advances. The cable will continue advices in so far as the censorship will permit. For the time being, Britain is a country without anything but official news, for every wire and cable out of the country is under the control of the censors, who pass, reject and strike out altogether, as they please.

The manufacturing and selling rights to the Klein boiler circulator, an apparatus for installation within a boiler for maintaining circulation and increasing the efficiency, have been taken over by the John Simmons Company, 110 Center street, New York. A new department has been created on this account under the direction of Paul M. Klein.

Metal Market

NEW YORK, August 19, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
Aug. 12	12.75	12.37½	62.00	3.85	3.67½	5.50	5.35
13	12.75	12.37½	60.00	3.85	3.67½	5.55	5.40
14	12.75	12.37½	50.00	3.85	3.67½	5.65	5.50
15	12.75	12.37½	.....	3.85	3.67½	5.65	5.50
17	12.75	12.25	39.00	3.87½	3.70	5.70	5.55
18	12.75	12.25	49.00	3.87½	3.70	5.75	5.60

Copper is still dull and easy. Tin is erratic with prices nominal. Lead is higher and somewhat more active. Spelter is strong and higher. Antimony is quiet and nominal as to prices.

New York

Copper.—Very little business is being done. Sales that have been made have been in small lots only, for prompt and September shipment, mostly in electrolytic at 12.25c., New York. Lake, if sold, is probably moving at ⅜ to ½c. higher. Actual necessity, however, characterizes all purchases, consumers evidently preferring to wait in anticipation of lower prices. In this they may or may not be disappointed, for the future is uncertain in such unusual market conditions. Arguments for a future rise or fall in prices can be equally forcibly advanced. Prices at present are largely nominal. An interesting feature is that exports, amounting to 3414 tons, were reported for yesterday, August 18, almost entirely to England. While small, it is significant of possible future expansion, with its consequent effect on the market. This makes a total of 9472 tons since the first of the month. The actual total outgo is perhaps less, since some copper, already sent in German bottoms, has come back. Production continues to be restricted, but to what extent this has gone is not actually known. The outcome of financial arrangements is also an important factor in the market's future. Conservatism is, however, generally the watchword.

Tin.—The English embargo on tin is no longer a fact, for shipments are being made. Some say that originally it was a false report, while others are of the opinion that if made it was removed in a few days. But in any case metal coming from the other side is limited to small amounts as compared with normal conditions. Financing shipments is still difficult and uncertain and much depends as to developments in this line. If arrangements could be made to finance Straits tin in New York instead of London, probably shipments could be facilitated and made. Owing to arrivals of tin the middle of last week, exceeding in amount what was generally believed probable, sellers became as eager to sell as buyers had been previously eager to buy when the price soared to 65c. to 68c. As a result there were fair sales at 39c. on Monday and small sales at 40c. to 42c., but the supply was soon exhausted. On Tuesday light sales were made at 49c. At present there is not much demand, and all sales have been of small lots only. Prices are largely nominal. The future is of course uncertain, depending on shipments and on financing. Shipments are believed to be possible but in small lots and not equal to consumption. As in copper, cogent arguments are available for either a future rise or fall in prices. Quotations from London are impossible, the Metal Exchange being closed. Arrivals up to August 18 total 2085 tons with 920 tons reported afloat. Tin is reported to have arrived at London from the Straits.

Lead.—This is the only metal that has not been decidedly affected by the European upheaval. There have been only moderate sales, but the demand is rather better than last week, with sales at 3.70c. to 3.72½c., St. Louis, and some sellers now holding at 3.75c. Total sales for the week ended August 15 were from 1500 to 2000 net tons. Most purchases are said to have been made for regular consumption. It is suggested that if the demand for silver falls off, there may result a curtailment in the supply of lead which may lead to further advances. The higher prices since last week are not clearly explainable.

Spelter.—The market is much stronger and steadily advancing. In the last 10 days the price has advanced nearly 1c. per lb. and this has not been due to domestic conditions. Heavy inquiries from England and Canada have caused the market to rise. The price to-day is 5.70c. to 5.75c. East St. Louis, or 5.85c. to 5.90c. New York, for prompt shipment. In addition to the large inquiries actually received it is expected that the elimination of foreign supplies from Germany and other sources will have decided effects.

Antimony.—A lull has taken the place of some little activity late last week and the market is at present listless. Prices on all grades are nominal, with 18c. for Cookson's, 16c. for Hallett's and 14c. for Chinese and Hungarian. The movements of Japan are closely watched, for if that country becomes involved and it places an embargo on antimony a possible famine in the metal is suggested, especially in the cheaper grades. The possibility of tin imports has lessened to some extent the demand for antimony, which was to be used as a partial substitute.

Old Metals.—The market continues dull and unsettled. Dealers' selling prices are about as follows:

	Cents per lb.
Copper, heavy and crucible	12.00 to 12.50
Copper, heavy and wire	11.50 to 12.00
Copper, light and bottoms	10.50 to 11.00
Brass, heavy	8.00 to 8.25
Brass, light	6.75 to 7.00
Heavy machine composition	11.75 to 12.00
Clean brass turnings	8.00 to 8.25
Composition turnings	9.50 to 9.75
Lead, heavy	3.70
Lead, tea	3.40
Zinc scrap	3.85

St. Louis

AUGUST 17.—The metal market has steadied down somewhat, though in spelter there has been an advance in prices with the demand heavier than ever. Quotations on spelter were to-day 5.60c. to 5.75c., with about 5000 tons reported taken during the past week for export, all of which is already on the way to the seacoast. More is reported wanted. Other metals are quoted as follows: Lead, 3.70c. to 3.75c.; tin, about 40c. to 41c.; Lake and electrolytic copper, nominal; casting copper, about 12½c.; Hallett's antimony, about 16½c.; Cookson's antimony, about 17c. In the Joplin ore market zinc blende has taken a sharp turn upward; early in the week it sold on a basis of $39 per ton for 60 per cent., but by Friday it jumped to $45 and the settlements for the choicest ores were made at $48. Calamine ranged from $21 to $22 for 40 per cent., with the best grades as high as $27. Lead ore was quiet at $46 for 80 per cent. Miscellaneous scrap metals are quoted as follows: Lead, 3.25c.; zinc, 3.50c.; tea lead, 3c.; pewter, 22c.; tinfoil, 32c.; light brass, 5.50c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9c.; heavy copper and copper wire, 10c,

Chicago

AUGUST 17.—The situation with respect to nonferrous metals has not cleared up to any great extent. The arrival of a supply of tin appeared to relieve the extreme uneasiness and quotations dropped abruptly. Copper has slumped a little more and lead is weak. The advance in antimony is being maintained and quotations of 20c. are a minimum with some of the principal dealers. Continued advances in spelter are noted and new prices are being quoted for zinc. We quote as follows: Casting copper, 12.62½c. to 12.75c.; Lake copper, 13c. to 13.25c. for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 40c. to 50c.; small lots, 40c. to 50c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.12½c.; Cookson's antimony, 15c. to 20c. for cask lots; other grades, 15c. to 20c.; sheet zinc, $7.25 f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11c.; copper bottoms, 9.75c.; copper clips, 10.25c.; red brass, 10.25c.; yellow brass, 7c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 33c.; block tin pipe, 35c.

Iron and Industrial Stocks

NEW YORK, August 19, 1914.

The stock exchanges are still closed, and not even a guess is being made as to when they may be reopened. Everything depends on developments in Europe. A ruling has been made by which the New York Stock Exchange has authorized private trading in securities. Buying orders accompanied by cash, at a price not less than the closing prices of July 30, 1914, will be received and they will then be sent to the exchange clearing house committee in the usual way and filled if possible. Cash securities offered for sale will be handled on the same basis.

Dividend Declared

The Harbison-Walker Refractories Company, regular quarterly, ½ of 1 per cent. on the common stock, payable September 1.

Specifications for Machinery Safeguards

The Eastman Kodak Company, Rochester, N. Y., has issued a circular to machinery manufacturers indicating its requirements as regards the safeguarding of machinery at the time of purchase. All machinery must conform, not only to the provisions of the New York State labor law, but must be provided with all proper safeguards for the protection of the operator and other employees. The company stipulates that if any deliveries made under a proposal do not fully conform to the specifications covering safeguards, it is at liberty to make any necessary changes at the expense of the seller.

Among others, the following protective devices are required:

1. Guards for all gears, even where apparently inaccessible, these guards to cover the full circle of the gear to mesh and to extend downward to the root of the gear teeth.

2. Flywheels, pulleys or gears without webs or filled-in spokes are to be fully protected and where necessary the rims are to be guarded.

3. Projecting set screws and keys on revolving parts, if used, are to be covered and key seats on projecting shafts are to be filled, or, where possible, the shaft is to be covered.

4. All sprockets are to be thoroughly guarded.

5. Wherever necessary, provision is to be made for instantly stopping and starting the machine by the operator.

6. All levers and switches controlling movement of machinery are to be so constructed that they can be locked to prevent the starting of machine.

7. All machinery, such as woodworking, to which guards are customarily applied by the purchaser, are to be provided with such guards before delivery. In all proposals the manufacturer is to specify the type of protective devices to be applied.

There were 1219 failures reported to Bradstreet's Journal for the full calendar month of July, an increase of 5.9 per cent. over June and of 14.4 per cent. over July a year ago. Compared with July, 1908, the increase is also 5.9 per cent., and failures for that month, in fact, were the heaviest in number ever reported in July, except in 1893. Liabilities for the month were rather heavy, aggregating $30,505,471, a decrease of 3.4 per cent. from June and of 44.7 per cent. from July a year ago, but exceeding those for July, 1912, by over two to one. Dun's Review reports 1411 failures in July and does not make the liabilities as high as stated above.

The C. Pardee Works, Perth Amboy, N. J., has recently increased its range of sizes in open-hearth hot-rolled soft steel bars and angles. At the present time the company is prepared to supply rounds from ⅜ to 4 in., squares from ⅜ to 3 in. and hexagons from ⅜ to 1 11/16 in. Flat bars from ⅛ x 1 in. to 1 x 5 in. are rolled regularly, as well as angles from ¾ in. on both legs to 3 x 3½ in., with a maximum thickness of ½ in.

PERSONAL

A number of important changes and additions have been made to the staff of the Ferro Machine & Foundry Company, Cleveland. J. C. Gorton has been engaged as factory engineer. He was connected with the Browne & Sharp Mfg. Company, Providence, R. I., for seven years; from 1890 to 1892 he was with the Yale & Towne Mfg. Company, Stamford, Conn.; from 1892 to 1899 he was associated with E. D. Leavitt, consulting engineer, Cambridgeport, Mass.; from 1899 to 1903 he was assistant engineer of plant with the American Locomotive Company at Dunkirk, and for the next four years he was engineer of plant at the Schenectady works. F. J. Patterson has joined the sales force, and will cover the Middle West. For some years he represented the Electric Welding Products Company, Cleveland. H. H. White has joined the sales force, covering the automobile field. He began his business career with the Cadillac Company, Detroit, in 1904, and in 1909 he entered the sales department of the Peerless Motor Car Company. C. W. Mason, who was secretary of the New Era Auto & Cycle Company, Dayton, will take charge of the marine engine promotion department. Ernest R. Fried has joined as mechanical engineer in charge of the motor engineering department From 1910 to 1913 he was connected with the General Motors Company, Detroit, as engineer and motor expert.

Clarence M. Woolley, president American Radiator Company, who, with his family, is now in Paris, has fitted up living apartments on an upper floor of the company's office building in that city. The European factories of this company are understood to have had their operations heavily curtailed by reason of the withdrawal of many of the workmen for military service.

A. Lincoln Reiley has been elected secretary of the Warren Foundry & Machine Company, Phillipsburg, N. J., succeeding S. A. Bristol. Mr. Reiley has been in the employ of the company for some time and his election to his new position is a promotion.

Lazard Kahn, stove manufacturer, Hamilton, Ohio, and a former president of the National Association of Stove Manufacturers, arrived in London August 14 from the Continent. A London cablegram states that at Frankfort he was arrested as a spy and detained for several hours until he satisfied his captors of his American citizenship.

A. J. Jones, for 19 years with the Fairbanks Company, has succeeded J. E. Bolles as treasurer of the J. E. Bolles Iron & Wire Works, Detroit, Mich. W. H. Lefevre, for a number of years head of the Marine Iron Company, Bay City, Mich., has been made sales manager of the Bolles Works.

Armand Alexandre, iron and steel merchant, with offices in the Peoples Gas Building, Chicago, was taken seriously ill August 10, being threatened with pneumonia. His physician hopes for a speedy recovery.

E. W. Oglebay, of Oglebay, Norton & Co., Cleveland, is in Europe, having gone abroad several months ago.

New Pennsylvania Steel Box Car

Carrying out its original plan of eventually having all its freight cars of the all-steel type, the Pennsylvania Railroad's mechanical engineer designed in 1912 a car, the framing of which can be used practically without change for either box, stock or refrigerator cars. A large number of these have since been constructed. A recent design of box car, designated as X-25, is built entirely of steel with the exception of a wooden floor and a ⅞-in. wooden lining. It weighs, mounted on arch bar trucks with 5½ x 10 in. journals, 49,000 lb. A new feature of this car is the manner in which the safety appliances are secured. All grab irons are fastened to castings by means of a slotted hole in the face which permits the removal of the grab iron bolt and thus the renewal of the grab irons without disturbing the inside lining.

Progress in the Export Trade Movement

MACHINERY GOING TO ENGLAND ON NEW ORDERS

The South American Trade Movement and Its Financing Having First Consideration—Possibilities of Japan—Argentine, Brazilian and Chilean Trade and the Share the United States Has Had

The efforts on which a number of leading men representing financial and industrial interests have been concentrating in the past week in New York and Washington have made a beginning of clearing up the shipping and foreign exchange problems of the war. The conference at Washington on August 14, attended by 60 representatives of trade, shipping and banking, resulted in the appointment of a committee to urge upon Congress a bill providing a $5,000,000 Government fund to insure war risks on ships and cargoes in the trade between the United States and Europe. The grain situation received first attention. Cotton will come next. Little has been done as yet on iron and steel shipments.

At Washington the Senate on August 17 passed the House bill removing restrictions on American registry for ships built abroad. W. R. Grace & Co. announce that they will transfer several of their vessels now flying the British flag to American registry.

Manufacturers in iron and steel and machinery lines have been actively at work in the week canvassing the possibilities of extending trade with countries not at war. At Cincinnati a meeting of the Export Club dealt definitely with South American trade, as reported below.

The proposal to bring Bolivian tin concentrates to the United States for smelting, and thus adding to the tin supply while adding an industry, has been taken up in New York. These concentrates have heretofore been shipped in large part to England and some have gone to Germany. They represent the equivalent of 20,000 to 25,000 tons of pig tin a year.

Fresh contributions are made in the following columns to the discussion of ways and means of increasing our trade with South America. Statistics are given showing the exports of iron and steel and machinery from the United States to South America in the fiscal year 1913. This country has only had a fraction of the total South American trade in these lines, most of it going to Germany, England and France. The United States, however, has been increasing its percentage.

Inquiries have come from Japan to this country for some of the raw materials of iron and steel manufacture. Much could be done in selling Japan American machine tools and other machinery under certain conditions.

Machinery Orders Since the War Opened

The latest development in the machinery trade is the receipt of orders from England dated since that country entered upon the war. The Windsor Machine Company, Windsor, Vt., has received one such order for a good lot of Gridley automatics and another large house building machinery has booked a similar order. Shipments to England have been resumed, several concerns having started machinery on its way across the water in the last few days, among them being the Potter & Johnston Machine Company, Pawtucket, R. I., and the Windsor Machine Company.

Private advices received by machine tool houses in this country state that the British government is taking over important machine shops for the purpose of manufacturing munitions of war, especially projectiles. The American automatics are peculiarly adapted to this purpose and probably the demand for them will be considerable. Doubtless, also, the demand from England will include materials that enter into the manufacture of this class of product.

Steps Taken at New York and Washington on Shipping Problems

Developments in New York City in the past week in the direction of opening up trade with Europe, particularly with England, show progress and have further impressed those at work on the problem with the magnitude of their task. A bulletin issued by the International Freight Bureau of the International Association of Manufacturers on August 17 predicted early relief from the shipping embargo and a reduction of rates for freight and insurance. The increase in freight rates has been general, 50 per cent. in those of White Star Line boats, 100 per cent. on American liners and 25 to 50 per cent. on vessels of most of the other lines sure of maintaining service to European ports. Rates to several Central American and South American points remain unchanged, though the Booth Line increased its charges to Amazon River ports 33 1-3 per cent.

The National Foreign Trade Council, which took the initiative in urging action by the Government, sent broadcast a circular letter announcing that it would cooperate with small manufacturers who desired to investigate foreign markets for the sale of their goods. The Chamber of Commerce of the United States, which has headquarters in Washington, will be asked to appoint a committee for the formulation of a plan of cooperation between the two bodies.

Argentina and Brazil have announced that they will send ships to the United States laden with Latin American products which will be exchanged for American finished products. Ambassador Edwin V. Morgan cabled from Rio de Janeiro that the Minister of Finance of Brazil is arranging to dispatch to the United States five vessels of the Brazilian Lloyd with consignments of coffee from Santos and Rio de Janeiro and rubber from Para, which are to take back cargoes of prime necessities. Dr. R. S. Naon, Argentine minister to the United States, was authorized last week by the Congress of Argentina to act as financial correspondent for that country. He is empowered to accept money from American importers and on his cable message the Bank of Argentina will make payments as directed.

The National City Bank will act as depository in connection with this arrangement. Business firms in Argentina desiring to buy goods in the United States will in turn deposit with the Bank of Argentina and Dr. Naon, on cabled advices from his government, can make payments to exporters here.

The feeling of greater confidence shown by New York exporters was accompanied by an improvement in the foreign exchange market. Grain bills appeared more freely, showing that some grain was moving. The total wheat and flour shipments last week were 3,726,000 bushels, which compares with 6,594,000 bushels for the previous week and 9,615,000 bushels for the last week in July. This week more grain is going forward and the week's total is expected to exceed 5,000,000 bushels.

THE CONFERENCE AT WASHINGTON

On Friday, August 14, many New York business men, including representatives of the National Foreign Trade Council, among them James A. Farrell, E. A. S. Clarke and Eugene P. Thomas, were in Washington in conference with Secretary of the Treasury McAdoo, to devise plans for restoring the foreign trade. The conference appointed three standing committees—on war risk insurance, transportation and foreign exchange. Of the second President Farrell of the Steel Corporation is chairman. These committees are to work in conjunction with Congress and the Treasury Department. The programme outlined by these committees took shape in the following recommendations:

1. That the Treasury Department deposit funds in the leading financial exporting centers to be exclusively used for the facilitation of exports.

2. The release of funds held in foreign countries resulting from the sale of shipments which have been diverted from their original destinations or commandeered. This question will be taken up with the State Department.

3. That the Federal Reserve Board take up the question of establishing an international clearing house for the settling of debits and credits of the nations.

4. The establishment of a Government bureau of war risk insurance to be administered by a director and employees, which shall assume the risks of war on American vessels and on cargoes shipped or to be shipped therein whenever in the judgment of the bureau it shall appear that the American vessels or shippers are unable in any trade to secure adequate war risk insurance on equal terms with vessels of shippers of other nationalities by reason of the protection afforded such vessels or shippers by arrangements for war indemnity throughout their governments.

5. That there be taken up immediately by Congress such amendments to the navigation laws of the United States as will serve to create a permanent foreign trade and an American mercantile marine practicable in character.

The subcommittee on transportation was expected to present a complete report of its views on Wednesday of this week.

THE CHILEAN SMELTER CONTRACT

Reports that the American Smelters' Securities Company was about to transfer a contract for a new and large smelter to be erected in Chile to American manufacturers, although the contract had been placed with a German firm, is somewhat inaccurate, inasmuch as the German company had already shipped a part of the machinery to South America before the trouble came upon Europe. The copper company is negotiating, however, for motors and de-chlorinating drums for the plant. Of the drums, the plans call for 22, but it is believed that in view of the present state of the copper industry, only 11 will be contracted for at this time. Only a few weeks ago the Allis-Chalmers Mfg. Company shipped to Chile some copper ore handling apparatus.

The contract for the Chilean smelter went to Germany for the reason that a machinery firm of that country made a flat price for furnishing the plant complete and erected, whereas American manufacturers were only willing to make such a price on the building of the plant and not its erection. The latter was fraught with difficulties because of the poor transportation facilities inland in Chile, among other things. It is explained that in the case of a contract of this kind the German manufacturer has had the advantage not only of lower shop costs, but of cheaper ocean freight and even where the ocean freight might be higher for the German, this was usually offset by the lower cost of production in his country. It is suggested that when Germany is restored industrially, this same condition will exist again on the West coast of South America, unless the Panama Canal turns the balance the other way. Several cases are reported where South American countries have already turned to this country for machinery, but not much is said of them specifically.

Distressing features of the present situation which continue to come to light are the canceling of contracts by concerns financed by foreign capital. One of these is the Otto Coking Company, which had started operations on a plant near Buffalo, N. Y. Cancellations were caused in this case by the cutting off of money from Germany. The Electric Bond & Share Company, which had a contract in Utah, has also canceled contracts for pipe, for the reason that the project was financed in Switzerland.

Options have, it is understood, been taken on a factory site in New York harbor for the development of coal tar products recovery and refining, to make up for deficiency of articles from which drugs and dyes have been imported from Germany.

An export and import commission merchant in New York is inquiring for a machine for cutting the cedar wood used in the manufacture and finishing of pencils for a pencil manufacturer in Japan. Quotations on this machinery have been received from Germany, but the order will undoubtedly have to be placed in this country on account of the war.

AMERICAN OPPORTUNITY TO MAKE TUNING PINS FOR PIANOS

A manufacturer of pianos has written to *The Iron Age* emphasizing the desirability of manufacturing tuning pins for pianos and other musical instruments in this country. Roughly speaking, the situation at present is as follows:

With normal demand, there are manufactured approximately 200,000 pianos in the United States per year. Each piano requires a complete set of tuning pins, and thus there is an approximate demand from the piano trade for 200,000 sets of tuning pins. Tuning pins are sold universally by the case, each case containing 60 packages of a sufficient number for one piano, or in other words sufficient pins for 60 pianos.

Heretofore tuning pins have been imported almost exclusively from Germany. Most of the importers have been caught without any supply. It is believed there is but one manufacturer in America making tuning pins, but the capacity of that plant will not permit of supplying more than perhaps one-third of the pins used in this country. It is thought that manufacturers of steel and iron products, unable to operate their plants, might be interested in taking up this matter, and as the prices quoted today show an increase of over 50 per cent. as compared with those quoted 30 days ago, there is ample margin at the present time, as well as a market which would take almost any kind of product that was reasonably good.

VIEWS OF SOME LARGE MANUFACTURERS

An interview with officials of two important electrical manufacturing companies and a number of other large industrial companies brings out strongly the fact that an increase in South American business is expected, and that while each of these companies has been doing a good export business and has representatives on the spot, and is capable of ascertaining the standing of the buyer, they will welcome the establishment of a banking system which will facilitate business as Europe's bankers have done. They dwell on the necessity of bankers recognizing the South American habit of expecting extended credit, and on any company desiring to enlarge in exports to take more of an individual initiative than is at present the tendency. There is at present a little waiting on the perfecting of financial arrangements. The idea of bartering, or of accepting merchandise in payment of export shipments does not attract, as importing houses already have warehouses stocked with raw materials which American manufacturers show no present disposition to buy.

South American Financing Very Important, Also Shipping Facilities

To the Editor: Complying with your request for comment upon the possibilities of increasing our trade with South America, I will begin by urging utmost caution. American manufacturers thoroughly familiar with the conditions that have prevailed in the past year in South American countries and even the most representative South American merchants are proceeding cautiously because of the financial readjustment occurring there.

South America has relied upon foreign capital to finance practically all of its big undertakings. With the beginning of the Balkan war a money tightness became prevalent. Land speculation drove the price of many properties to twice their real value. Money borrowed from Europe paid for these lands. To-day many owners of fine camps and plantations find themselves in the position of being able to earn just sufficient profit to pay the interest on their loans. Misfortunes in crops have embarrassed these owners seriously. These conditions were in existence before the great crisis in Europe. The war has made it impossible for these growing countries to float their loans abroad and unless the bankers and capitalists of the United States go to their relief dull times will continue to prevail.

Too many of us are aroused to action by the fact that England, Germany and France, which formerly controlled the lion's share of South American business, are now at war. We must keep in mind that these same countries consumed a proportionate amount of the exported products of all South American nations. These conditions will not tend to solve the financial problems of the latter which were so serious before the European war began.

The merchants of Brazil, Argentina, Chile, are not accepting orders without full information on the financial standing of their customers and it will be well for manufacturers in the United States to follow their example.

In my opinion two very important steps must be taken by North Americans to secure permanent profitable business relations with the nations south of us. The first is proper shipping facilities. Some important and well directed efforts to accomplish this are now in progress but all need the hearty support of every manufacturer interested in this field. The second is an awakening of United States bankers and capitalists to the splendid opportunities for investment offered them in that field.

A year ago in Europe I learned to my regret that a large American railroad construction firm operating in Argentina and Brazil was forced to appeal to English and French capitalists. The European capitalists in cases of this kind exact that European products must be purchased. Many railroads, rubber plantations, nitrate fields, public utilities, mines, etc., are financed by Europeans on this basis. Therefore, notwithstanding the superiority of United States products we lose the order. I called upon the chairman of one of the largest railroads in Brazil whose headquarters were in London. He said: "If we intended purchasing $100,000 worth of material we would dislike very much for one dollars' worth of it to be purchased in the United States if it could be procured in Europe."

I cannot put too much emphasis on this impediment to the success of manufacturers of the United States in endeavoring to secure a foothold in South America and urge that it be given due consideration by our financial institutions.

We may either improve or endanger our future relations with these countries by our actions and methods of doing business at this time.

Europeans have made a careful study of the needs, the temperament and business customs of South American people. Our methods in the United States are very different, and business policies that apply here will not be looked upon with favor there.

South America is full of intelligent, shrewd business men, honest and reliable. They are proud of the progress they have made and if we wish to gain their confidence we must send them just what they order to the last detail; we must do business with them as they are accustomed to doing it, and devote all our efforts to please them and win their respect.

I am positive this can be accomplished in one way only: Send experienced, tactful representatives, speaking fluently the language of the country they visit, to study conditions, make acquaintances and, most important, to ascertain the exact requirements of the trade. Then fill that requirement without one hint of substitution.

By this procedure due caution will be observed and financial risks minimized on immediate business. By no other means can enduring commercial supremacy be gained in this land of opportunity.

G. H. CHARLS,
Manager of Sales, American Rolling Mill Company.
MIDDLETOWN, OHIO, August 15, 1914.

Cincinnati Export Club Discusses South American Trade

CINCINNATI, OHIO, August 14, 1914.—Manufacturers in the Central West are keenly interested in extending the South American trade during the present European conflict. The Export Club of this city, a branch of the Cincinnati Chamber of Commerce, in its short existence has aided its members materially in developing new fields. On August 12 an important noonday meeting was held at the Queen City Club, attended by many nearby outside manufacturers. Consul General Alfred A. Winslow, stationed at Valparaiso, Chile; W. F. Keyes, representing the National City Bank, New York, and George M. Verity, president American Rolling Mill Company, Middletown, Ohio, were the principal speakers.

IMPORTANCE OF CHILEAN TRADE

Consul General Winslow dealt with the resources and export and import trade of Chile. Its area is about that of Texas, with a seacoast of 2500 miles. There is a central valley north and south, which in the north has the nitrate fields of the country and in the south agricultural and grazing lands. The government is republican and the Chileans are called the "Yankees of South America." Exports have exceeded imports for many years. The railroad mileage is 4000, of which the government controls 2300 miles. Practically all rolling stock is imported, the two shops in the country doing such work having a capacity of but 30 locomotives and 25 cars a year. Thus far 90 per cent. of the rolling stock has been bought in Europe. American manufacturers of railroad supplies and rolling stock are not disposed to make the changes called for by the Chilean authorities, nor are they willing to accept the terms of payment as a rule.

The imports into Chile amount to $120,000,000 to $125,000,000 annually, of which 90 per cent. represents the value of manufactured articles. In 1913 imports from the United States amounted to $20,000,000 against $8,700,000 for 1908; from England $36,000,000 against $30,600,000 in 1908; from Germany, $29,600,000 against $27,500,000 in 1908; from France, $6,600,000 against $6,300,000 in 1908. American interests promise to continue the increase shown above and should supply from 40 to 50 per cent. of Chile's imports if they keep on improving their methods as in the past.

There is a growing demand in Chile for machinery and American interests seem to no more than hold their own, when they should gain since American machinery in the main is considered superior, but too high priced. American agricultural machinery leads, while England leads in industrial machinery and Germany in electrical machinery and supplies. One important item in favor of the English and German importer is the fact that most of the electrical and industrial engineers are German or English. American engineers are considered too expensive.

In coal, oil, etc., the United States supplied $6,000,000 in 1913, very largely crude fuel oil; England, a total of $7,800,000, coal being an important item; Australia, $3,500,000 of coal. On the opening of the Panama Canal it is expected the United States will

supply much of this coal trade which amounts to $10,000,000 annually.

The imports of precious metals and jewelry, iron and steel, earth and stone, amounted in 1913 to $22,300,000, of which the United States supplied $4,400,000; England, $6,000,000, and Germany $8,000,000. The United States made a gain of $500,000 from 1911 to 1913, principally iron and steel, while England lost $1,300,000 in mineral and metal products, and Germany $1,500,000 in that time.

The exports of Chile are increasing very rapidly and amounted to $144,600,000 in 1913 against $120,700,000 for 1911. The United States took $30,418,000 during 1913 against $19,600,000 for 1911; while England took $55,700,000 in 1913 against $53,000,000 for 1911; and Germany $30,800,000 in 1913 against $26,200,000 for 1911. Fully 80 per cent. of the exports consist of minerals, of which 80 per cent. is nitrate of soda.

There is a large amount of foreign capital invested in Chile, with England well in the lead and the United States at least fourth, but gaining rapidly. This has a strong influence on trade with the respective countries and may become a strong factor in American exports to the country. Much American capital has been invested in mineral property during the past three years, and more is headed that way. All of this will call for American machinery unless the American manufacturer allows it to go to a European house, as was the case of an electrical installation valued at $3,000,000 for an American mining company, that was supplied by a German house because their prices were lower and terms better.

NATIONAL CITY BANK PLANS

Mr. Keyes explained the plans of the National City Bank in the establishment of branches at Buenos Aires and Rio Janeiro. The directors of that bank, he said, had set aside $1,000,000 capital for each of these branches. Each branch will have a competent banking staff—men trained in the foreign field with American ideas of banking methods. One further step of importance to American manufacturers will be the placing of trade representatives as attachés of these branches. These representatives will canvass the Brazilian and Argentine trades and act as pioneers for American manufacturers, seeking constantly to interest Argentine and Brazilian merchants in American goods. Mr. Keyes gave the statistics of our trade with Brazil and Argentine in recent years. Sales to the Argentine in 1908 were $34,000,000; in 1912 they were $67,000,000. Our sales to Brazil were $19,490,000 in 1908 and $34,678,000 in 1912. In 1912 Great Britain, France and Germany sold $368,000,000 worth to South America and the United States $132,000,000 worth. He called attention to the increasing number of vessels that would be put into the South American service as a result of legislation pending at Washington.

UNITED STATES MUST HELP FINANCE SOUTH AMERICA

George M. Verity said in part:

"From both a humanitarian and commercial standpoint, the United States will be called upon to supply the real needs of South America and other dependent countries, and it would seem to me that our productive capacity in almost every line will be taxed for many years to come if this great need is to be met. We were never in better shape to meet such an emergency and we must be equal to it.

"As regards South America we are informed that both Brazil and the Argentine have been going through a financial and commercial depression for the past year, due to their inability to finance their requirements. It is certainly encouraging to know that one of our great New York banks proposes to establish a branch at Rio and another at Buenos Aires, as there can be no great exchange of business between the United States and South America until that is done. It is absolutely essential to the development of that business.

"Under existing conditions there is, however, another factor that I feel is of greater importance than the establishing of American banks in Latin America. That factor is the necessity for some strong interest to finance these South American countries, and the question is whether the United States has the ability to do it.

"Business has been at a standstill in Brazil for more than a year, while the Government has been endeavoring to negotiate needed loans with the countries and interests that are already heavily involved in South America. It had been confidently expected that a $125,000,000 loan would be obtained for Brazil this fall from European interests with which negotiations have been going on, but that is now out of the question, and I do not see how the country as a whole can proceed until financial relief is obtained. If we are equal to the need, a great opportunity to establish permanent financial and commercial relations is not only before us but is pressing for consideration.

"I hope it will be possible for the great banking institutions in all of our main centers of trade to get together and to meet this situation.

"There is absolutely no question about the opportunity in South America at this time. It is simply a matter of financing and transportation."

World Imports of Argentina

The opportunity for increasing trade with the South American countries is indicated by a study of foreign commerce figures. The latest available in a complete way for the Argentine Republic, by considerable the country in South America having the heaviest foreign trade, are those for 1912. While the 1913 figures may show some radical differences, it seems clear that the United States still holds quite a minor position. For example, of about $40,000,000 imports into Argentina of iron, steel and machinery, the United States contributed less than 14 per cent., though when about $4,380,000 total importation of agricultural machinery is included the United States percentage rises to 20 per cent., so large a part does this country take in supplying agricultural machinery.

The total foreign commerce of the Argentine Republic for 1912, that is, the total of imports and exports, amounted to $865,244,725,—larger than the foreign commerce for that year for Canada, and, next to the United States, the largest in the Western Hemisphere. The five leading countries in point of foreign trade, using 1912 figures, are as follows:

United States	$3,996,160,487
Argentine	865,244,725
Canada	841,002,814
Brazil	695,630,053
Chile	260,215,093

The next in the list are Cuba, Mexico, Uruguay (with a commerce amounting to $108,129,445), British West Indies, Porto Rico, Peru, Bolivia, Venezuela, etc.

Without going into the figures in detail, in the following are given some of the important classifications of importations and the percentages of importation from countries having the bulk of the business:

Importations into Argentina in 1912

Automobiles $5,346,149
France, 43 per cent.; Germany, 15 per cent.; United States, 10 per cent.

Coal $25,955,291
United Kingdom, 94 per cent; United States, 3 per cent.

Galvanized iron $6,383,572
United Kingdom, 66 per cent.; United States, 22 per cent.; Germany, 6 per cent.

Galvanized wire $2,088,847
Germany, 51 per cent.; United States, 31 per cent.; United Kingdom, 12 per cent.

Steel beams, etc $3,395,198
Germany, 56 per cent.; Belgium, 22 per cent.; France, 15 per cent.; United States, 3 per cent.

Pig iron and plates* $6,516,677
Belgium, 42 per cent.; Germany, 39 per cent.; United Kingdom, 10 per cent.; United States, 6 per cent.

Steel rails $5,272,960
United Kingdom, 43 per cent.; Germany, 26 per cent.; United States, 14 per cent.

Railroad cars $3,950,791
United Kingdom 69 per cent.; United States, 14 per cent.; Belgium, 13 per cent.

Machinery, not including electric motors, agricultural machinery, locomotives, etc. $6,985,917
Germany, 37 per cent.; United Kingdom, 30 per cent.; United States, 16 per cent.; France, 6 per cent.

Reaping machines $2,811,249
United States, 71 per cent.; Canada, 11 per cent.; United Kingdom, 2 per cent.

Threshing machines $1,572,654
United States, 80 per cent.; United Kingdom, 12 per cent.; Germany, 8 per cent.

*Given in one place as "Pig and Sheet Iron" and in another as "Iron Ingots and Plates."

In 1908 and in nine months of 1913 the percentages of total imports of all kinds into Argentina compared as follows: United Kingdom, 34.2 per cent. in 1908 and 30.1 per cent. in 1913; Germany, 13.9 per cent. in 1908 and 18.3 per cent. in 1913; United States, 13 per cent. in 1908 and 13.9 per cent. in 1913; France, 9.7 per cent. in 1908 and 9.8 per cent. in 1913. Of the total exports from Argentina in nine months of 1913, 26 per cent. went to the United Kingdom; 11.2 per cent. to Germany; 8.6 per cent. to the United States, and 2.9 per cent. to France.

Bolivian Tin Once Smelted at New York

In the last few days of the tin stringency there has been much talk about the importation to this country of Bolivian barilla or tin concentrates, which have in time past been shipped to England for smelting, but it is a question as to where the facilities for the production of refined tin can be found in this country. A representative of a large interest in the metal business which buys considerable tin said it had given some thought to the subject, but had taken no definite steps and that the matter was one in which it was necessary to move slowly. Some Bolivian tin, sold here to some extent, is known as English Lamb and Flagg tin, after having been refined, the name having been derived from an old English brand of Cornwall tin. It is a matter of history that a number of years ago a company known as the International Tin Smelting Company was organized with a plant at Bayonne, N. J., for the smelting of Straits ores, but subsequently such a heavy export tax was put on ores and concentrates from the Straits Settlements that the project was abandoned. Subsequently the late H. H. Rogers of the Standard Oil Company and some of his associates bought the plant, but the smelter was not a success and the property is now owned by a company manufacturing vegetable oils.

Authorities in the tin business say that it is only at great cost that Bolivian tin can be worked to a sufficiently high degree of purity to make it suitable for tin plate and high grade solder. It was suggested, however, that should necessity arise, some way might be found of making this tin available for all purposes.

The War Has Brought Some Business to New England

The New England editor of *The Iron Age* writes as follows concerning the effects of the war on industrial operations in that section:

"The American plants which are operated as branches of European industries, and created chiefly to avoid the tariff, are already preparing to take care of the demand which had been served by their home factories. The management of one of these American works is quoted as saying that less than 10 per cent. of the working force in the German plant are now available, the remainder having been called to the colors. Probably this percentage is not far from the average in Austria and France as well as Germany. Belgium is devoting its entire energies to war and the British works are rapidly being depleted of their help.. Therefore, wherever foreign houses have been taking care of their American trade from a factory located here, the scope of the market which they must serve has been greatly increased. Some of them will doubtless enlarge their plants and increase their equipment. Much of their machinery has been imported from the home countries and this can no longer be had. Already one of these concerns has made inquiries with the intention of having a large amount of special machinery built in New England. Such cases as these will become more frequent as the weeks pass.

"The expectation is that the first American industry to feel the impetus of the war will be cotton goods. A great company building cotton machinery, one of the largest in the world, is absolutely confident that there will be a large demand for its product; so confident, indeed, that it is making inquiries for pig iron for its foundry, following immediately upon the placing of a contract for 5000 tons, which was all that was deemed necessary for the expected business. The war has caused this important change in plans. Inquiry among the dealers in cotton who, of course, are in very close touch with the consumers, prove that they are not worrying a bit, in spite of the fact that the cotton exchange is closed and nobody knows the actual values of the material. They are looking for a production of textiles so great that the temptation may be to overdo the erection of new mills; this would be calamitous, they say, when Europe will have got on her feet again, with the war a thing of the past. American textile mills, however, contain much machinery that is old, even obsolete, and the outlook is that replacements will total large figures.

"The beginning is being made by New England chambers of commerce and other trade organizations in studying conditions in South America and Central America and other countries where Europe has had the predominance of trade, with a view to assisting the building up of the export business of their members. Very little progress has been made as yet, and there seem to be very few men who are equipped by experience to assist in this campaign. The American manufacturers know the export trade from their office end, but are not familiar with the work that will be necessary to procure the desired expansion, especially under the conditions which must be confronted at this time. Individual effort to get on the ground and meet the situation at first hand has already begun. Another method of campaign is by groups of manufacturers whose lines are kindred though not conflicting to any great extent."

Japan's Iron and Steel and Machinery Imports

Japanese houses in New York which deal in iron and steel products and machinery have as yet no definite orders from Japan for American machinery to replace what cannot be obtained from Europe. Takata & Co., 50 Church street, have been inquiring in this country, however, for some raw materials for the Imperial Steel Works of Japan. One item is 1000 tons of low phosphorus pig iron to replace hematite iron heretofore bought in England. Ferromanganese and ferrosilicon are also wanted for the same works and a quantity of nickel.

American makers of textile machinery, partly owing to their unwillingness to adapt their designs to the demands of China and Japan where in many cases coarse woven goods are desired rather than the fine weave for which American machinery is made, have not done a large trade in the Orient. In machine tool lines English and German firms in recent years have commanded the greater part of the Japanese trade. American manufacturers now have the opportunity to displace German machines.

Takata & Co. had considerable contracts for structural work in Japan in the hands of German manufacturers when the war broke out. The status of these contracts will require a little time to determine. Some shipments of steel were on the water recently. The question of having the unfinished work done by American or English concerns must now be taken up.

The following table presents some figures dealing with the importation of iron and steel and machinery by Japan. The statistics for the total imports and those from England and Germany refer to the calendar year 1911, while those for the United States are for the fiscal year ended June 30, 1913.

	All nations	England	Germany	United States
Pig iron	$3,463,500	$1,929,550	$10,250	$29,985
Bars, plates, shapes, etc.	10,828,000	2,161,455	2,103,250	856,648
Sheets and tin plates	.....	.....	153,000	487,061
Wire products	1,182,000	.....	1,071,750	451,230
Rails	2,752,000	.....	979,500	1,267,264
Castings	.....	.....	539,500	9,983
Pipe and fittings	2,134,000	691,270	158,000	1,663,951
Metal working machinery	.....	.....	129,500	119,558
Locomotives	1,883,000	.....	394,250	1,302,346
Automobiles	.....	.....	33,500	397,277

The total amount of goods of all kinds imported in 1911 was $256,471,000 and the total value of machinery of all kinds imported from Germany in that year was $2,514,500.

Our Exports of Iron and Steel and Machinery to South America in 1913

In view of the conditions resulting from the war, the following table will be of interest as bearing upon our trade with South America. The value of our exports to the principal countries there for the fiscal year ended June 30, 1913, are given for the leading iron, steel and machinery products. In nearly all articles Argentina, Brazil and Chile rank first, though in a few cases another country may surpass one of these. In most cases Peru ranks fourth in the amounts imported though here also there are a few exceptions. The four countries mentioned, however, receive the bulk of our shipments in these lines. For comparison the total for all of South America is also given in the table. The figures are based on the data contained in the volume issued by the Department of Commerce, Bureau of Foreign and Domestic Commerce, entitled "Commerce and Navigation of the United States, 1913."

Exports of Iron and Steel and Machinery from the United States to the Principal South American Countries for Fiscal Year Ending June 30, 1913

Articles	Argentina	Brazil	Chile	Peru	Total for all South America
Pig iron	$2,671	$11,574	$13,637	$5,475	$35,130
Bar and rods	85,405	100,208	210,266	41,800	477,836
Bolts, nuts, rivets and washers	172,243	22,632	29,421	186,423	273,958
Builders' hardware (locks, hinges, etc.)	218,287	236,427	82,035	54,465	720,121
Car wheels	90,099	21,998	8,030	474	126,555
Castings, misc	8,388	13,609	3,627	19,624	59,127
Cutlery	74,886	86,711	7,020	1,849	190,284
Firearms	205,088	587,933	38,861	22,189	1,062,583
Hoop, band and scroll	35,767	5,394	.....	.....	.....
Machinery, machines and parts of:					
Adding machines	40,773	26,500	2,271	.....	81,292
Air compressing m'ch'y	20,678	55,802	17,646	2,514	98,630
Preservers' m'ch'y	85,114	41,180	.....	.....	126,358
Cash registers	260,526	1,556	364,641	1,078	733,310
Elevators and elevator m'ch'y	241,315	94,637	2,412	15,303	362,919
Metal working m'ch'y (including metal-working machine tools)	112,747	346,187	43,930	40,651	571,919
Milling m'ch'y	33,776	53,988	58,246	1,464	210,753
Mining m'ch'y	127,251	285,119	182,017	258,870	1,029,375
Printing presses	89,845	100,186	7,438	14,239	259,043
Pumps and pumping m'ch'y	182,780	120,456	73,527	51,473	512,861
Sewing machines and parts of	880,141	1,677,141	94,774	67,334	3,261,863
Sugar mill m'ch'y	7,016	153,590	7,345	20,531	341,868
Typesetting, linotype, etc	146,335	151,379	9,421	5,915	333,689
Typewriting machines	355,320	351,640	117,023	67,578	1,097,123
Woodworking machines	29,140	120,896	76,898	12,469	266,791
All other machines and parts of	399,016	507,967	255,028	131,861	1,796,298
Nails and spikes, etc	50,292	58,492	118,451	26,981	319,181
Pipes and fittings	224,165	374,455	111,932	152,655	1,088,005
Steel rails	695,018	1,031,884	458,827	181,553	2,868,507
Railroad track material (except rails and spikes)	72,886	388,143	55,747	61,748	675,655
Galvanized sheets and plates	513,586	101,959	337,075	131,352	1,483,242
All other sheets and plates	393,676	60,603	8,427	.....	488,197
Steel plates	34,363	10,519	67,529	24,988	142,375
Steel sheets	2,886	7,274	750,000	61,662	836,438
Structural iron and steel	94,779	467,922	232,181	88,062	994,090
Tin plates, terne and taggers' tin	247,646	217,139	180,188	25,266	703,975
Tools (axes, saws, hammers, etc.)	746,780	938,001	194,744	83,931	2,284,899
Wire	1,298,587	902,327	478,624	32,714	3,270,468
All other manufactures of iron and steel	413,668	379,577	251,787	230,264	1,525,903
Steam and other engines and parts of	861,774	298,961	33,184	54,198	1,382,705
Steam locomotives	.....	2,310,853	202,753	89,540	2,665,867

Compared with 1912, in most articles the figures for 1913 are either equal or in excess. There are a few exceptions. The exports of steel rails in 1912, to the four countries under consideration, were nearly $1,250,000 greater than in 1913, and about $1,000,000 greater for all of South America. In the item, "all other sheets and plates," the excess of 1912 over 1913 was nearly $2,000,000 for the four countries and about $2,500,000 for all of South America. In "all other manufactures of iron and steel," 1912 exceeded 1913 by a little over $1,300,000.

The exports of pig iron and locomotives for all of South America were about $1,200,000 greater in 1913 than in 1912 while in metal working machinery the two years show about equal values.

The Cambria Steel Company, Johnstown, Pa., states that a shipment of switches and other track supplies for street railroad work in St. Petersburg, Russia, has arrived safely at its destination.

The Carnegie Steel Company is now operating 36 blast furnaces and has 22 idle. No. 3 Duquesne furnace was blown in August 7 and No. 4 Mingo was started August 13.

MERCHANT BAR OUTPUT IN 1913

Production of Merchant Bars, Concrete Bars, Skelp, Etc., in United States

Special statistical bulletin No. 8, issued by the Bureau of Statistics of the American Iron and Steel Institute, William G. Gray, statistician, gives the official figures of the production in the United States in 1913 of merchant bars, bars for reinforced concrete work, skelp, nail plate and miscellaneous rolled iron and steel products. Detailed statistics of the output in 1913 of rails, structural shapes, wire rods, plates and sheets, black plates, or sheets, for tinning, tin plates and terne plates, wire nails and cut nails have already been published.

Merchant Bars

The production of iron and steel merchant bars in 1913 amounted to 3,957,609 gross tons, against 3,697,114 tons in 1912, an increase of 260,495 tons, or over 7 per cent. Of the total in 1913 about 1,026,632 tons was iron, against about 944,790 tons in 1912, a gain of 81,842 tons, and about 2,930,977 tons was steel, against about 2,752,324 tons in 1912, a gain of 178,653 tons. In the following table the production of iron and steel merchant bars in 1913 is given separately by States. Horseshoe bars, bolt and nut rods, spike and chain rods, concrete bars, etc., are not included.

States—Merchant bars.	Iron.	Steel.	Total.
Maine, Massachusetts, Rhode Island, & Conn.	32,166	37,066	69,232
New York	26,852	141,204	168,056
New Jersey and Maryland	27,039	36,443	63,482
Pennsylvania	386,883	1,543,229	1,930,112
Virginia, Ky., Tenn., N. C., Ga., and Texas	40,500	6,099	46,599
Alabama	2,200	45,086	47,286
Ohio	90,835	383,544	474,379
Indiana	218,021	319,864	537,885
Illinois	89,986	364,089	454,075
Michigan, Wisconsin, and Missouri	77,264	39,752	117,016
Colorado, Washington, and California	34,886	14,601	49,487
Total for 1913	1,026,632	2,930,977	3,957,609
Total for 1912	944,790	2,752,324	3,697,114
Total for 1911	835,625	2,211,737	3,047,362
Total for 1910	1,074,163	2,711,568	3,785,731
Total for 1909	952,230	2,311,301	3,263,531
Total for 1908	685,233	1,301,405	1,986,638
Total for 1907	1,440,356	2,530,632	3,970,988
Total for 1906	1,481,348	2,510,852	3,992,200
Total for 1905	1,322,439	2,271,162	3,593,601

The production of iron and steel merchant bars is given below by States from 1908 to 1913.

States—Gross tons.	1908.	1909.	1910.	1911.	1912.	1913.
New England	28,944	34,533	44,882	31,983	35,498	69,232
New York	82,966	67,396	97,478	110,682	183,757	168,056
Pennsylvania	911,721	1,646,834	1,994,092	1,528,771	1,878,388	1,930,112
New Jersey	34,596	51,359	46,986	46,197	56,743	68,728
Del., Md., and Va.	21,002	22,426	10,546	16,764	3,674	
W. Va., Ky., Tenn., N. C., Ga., & Tex.	30,624	55,221	52,259	48,881	40,874	41,353
Alabama	12,727	17,626	31,389	28,591	33,004	47,286
Ohio	276,312	441,145	407,012	300,655	394,574	474,379
Indiana	152,862	199,580	291,728	334,155	480,510	537,885
Illinois	236,111	411,575	483,257	368,465	380,868	454,075
Mich., Wis., & Mo.	138,760	247,787	252,468	162,719	151,521	117,016
Kan., Col., Wash., Wyo., Ore., & Cal.	60,013	38,049	73,634	69,499	57,703	49,487
Total	1,986,638	3,263,531	3,785,731	3,047,362	3,697,114	3,957,609

Concrete Bars

In 1913 the production of iron and steel bars for reinforced concrete work amounted to 319,670 gross tons, as compared with 274,332 tons in 1912, an increase of 45,338 tons, or over 16.5 per cent. Of the total in 1913 about 113 tons was iron, as compared with about 2500 tons in 1912, and about 319,557 tons was steel, as compared with about 271,832 tons in 1912. The following table gives the output by States of concrete bars in 1913, iron bars being separated from steel bars.

States—Concrete bars.	Iron.	Steel.	Total.
Maine, New York, and New Jersey	.....	75,376	75,376
Pennsylvania	.....	47,986	47,986
Virginia, Georgia, Alabama, and Texas	113	13,102	13,215
Ohio	.....	68,763	68,763
Indiana	.....	27,542	27,542
Illinois	.....	33,814	33,814
Wisconsin and Missouri	.....	19,959	19,959
Colorado, Washington, and California	.....	33,015	33,015
Total for 1913	113	319,557	319,670
Total for 1912	2,500	271,832	274,332
Total for 1911	2,388	256,353	258,741
Total for 1910	4,645	236,464	241,109
Total for 1909	.....	159,352	159,352

The following table gives the production by States of iron and steel concrete bars from 1909 to 1913. Statistics are not available prior to 1909. Gross tons are used.

States—Concrete bars.	1909.	1910.	1911.	1912.	1913.
Maine, New York, and N. J.	36,516	67,642	59,395	69,755	75,376
Pennsylvania	29,887	71,081	75,525	75,639	47,986
Virginia, Georgia, Ala. and Tex.	1,500	3,260	8,181	13,005	13,215
Ohio	71,032	53,788	55,008	8,728	68,763
Indiana	5,564	21,119	16,140	24,902	27,542
Illinois	11,385	13,985	26,941	33,803	33,814
Wisconsin and Missouri	.....	2,000	2,958	18,907	19,959
Colorado, Wash., and California	3,468	8,234	14,593	31,593	33,015
Total	159,352	241,109	258,741	274,332	319,670

Iron and Steel Skelp

The production of iron and steel skelp and flue and pipe iron in 1913 amounted to 2,501,964 gross tons, as compared with 2,446,816 tons in 1912, an increase of 55,148 tons, or over 2.2 per cent. Of the total in 1913 about 312,746 tons was iron, as compared with about 327,012 tons in 1912, a decrease of 14,266 tons, and about 2,189,218 tons was steel, as compared with about 2,119,804 tons in 1912, an increase of 69,414 tons. In the following table the output of iron skelp in 1913 is separated by States from the output of steel skelp.

States—Skelp.	Iron.	Steel.	Tota
New York, West Virginia, and Wis.	15,726	254,597	270,323
Pennsylvania	248,045	789,539	1,037,584
Ohio	48,975	1,145,082	1,194,057
Total for 1913	312,746	2,189,218	2,501,964
Total for 1912	327,012	2,119,804	2,446,816
Total for 1911	322,397	1,658,276	1,980,673
Total for 1910	350,578	1,477,616	1,828,194
Total for 1909	370,151	1,663,230	2,033,381
Total for 1908	297,049	853,534	1,150,583
Total for 1907	444,536	1,358,091	1,802,627
Total for 1906	391,517	1,137,068	1,528,585
Total for 1905	452,797	983,198	1,435,995

Nail Plate

The production of iron and steel plate for the manufacture of cut nails and cut spikes in 1913 amounted to 37,503 gross tons, against 45,331 tons in 1912, a decrease of 7828 tons, or over 17.2 per cent. Of the total production in 1913 about 32,459 tons was steel and about 5044 tons iron, against about 36,658 tons of steel and 8673 tons of iron in 1912. These figures are not included in the production of plates and sheets, statistics for which have already been published.

The following table gives by States the production of nail and spike plate from 1887 to 1913.

Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.	Years.	Gross tons.
1887	208,432	1894	108,262	1901	68,850	1908	45,747
1888	289,891	1895	95,085	1902	72,936	1909	63,746
1889	239,409	1896	72,137	1903	64,102	1910	45,294
1890	251,828	1897	94,054	1904	61,601	1911	48,522
1891	223,312	1898	70,188	1905	64,542	1912	45,331
1892	201,242	1899	85,015	1906	54,211	1913	37,503
1893	156,113	1900	70,245	1907	52,027	.....	.....

Miscellaneous Rolled Products

The production of spike rods, bolt rods, horseshoe bars, long angle splice bars, long tie-plate bars, hoops, bands, cotton-ties, strips, sheet piling, railroad ties, rolled axles, shafting, tires, steel wheels, scroll iron or steel and other miscellaneous forms of finished rolled iron and steel is given in the following table, iron products being separated from steel products. Rolled blooms, billets and axle blanks or billets for forging purposes are included, but forged armor plate, hammered axles and other forgings are not included. For 1912 and 1913 blooms, billets, sheet bars, tinplate bars, and other semi-finished products rolled for export, as reported to us by the manufacturers, are included, but for 1911 and all prior years they are not included.

In 1913 the production of the miscellaneous rolled products above named amounted to 3,250,901 gross tons, as compared with 3,490,213 tons in 1912, a decrease of 239,312 tons, or over 6.8 per cent. Of the production in 1913 about 264,320 tons was iron and about 2,986,581 tons steel, as compared with about 272,757 tons of iron and about 3,217,456 tons of steel in 1912.

Miscellaneous rolled products—Gross tons.	Iron.	Steel.	Total
Hoops	.....	280,886	280,886
Bands and cotton-ties	.....	499,660	499,660
Long angle splice bars, fish-plate bars, tie-plate bars, and other rail joint shapes	46,574	639,816	686,390
Sheet piling	.....	46,289	46,289
Railroad ties	.....	44,244	44,244
Spike and chain rods, bolt and nut rods, horseshoe bars, strips, etc.	217,343	850,101	1,067,444
Rolled forging blooms, billets, etc.	403	536,807	537,210
Blooms, billets, sheet bars, etc., for export	.....	88,778	88,778
Total for 1913	264,320	2,986,581	3,250,901
Total for 1912	272,757	3,217,456	3,490,213
Total for 1911	199,172	1,831,042	2,030,214
Total for 1910	207,003	2,413,713	2,620,716
Total for 1909	250,110	2,005,132	2,255,242
Total for 1908	183,649	990,738	1,174,387

Included in the above figures for 1913 are 149,907 tons of angle splice bars, 324,428 tons of tie plates, 8917 tons of fish plates and 144,226 tons of other rail joints, making a total of 627,478 tons, against a total in 1912 of 527,771 tons.

All Kinds of Finished Rolled Forms

By the phase rolled iron and steel we include all iron and steel rolled into finished forms, as follows: (1) all sizes of iron and steel rails; (2) plate and sheet iron and steel; (3) iron and steel plates for cut nails and cut spikes; (4) wire rods; (5) iron and steel structural shapes; (6) merchant bars; (7) bars for reinforced concrete work; (8) skelp; and (9) long angle splice bars, tie-plate bars, fish-plate bars, sheet piling, railroad ties, cotton-ties, bands, hoops, bolt and nut rods, rolled axles and other rolled products. Forged armor plate, hammered axles and other forgings are not included, nor such intermediate rolled forms as muck bars, slabs, blooms, billets, tin plate and sheet bars, etc., unless these intermediate rolled forms were for export, in which event they have been included for 1912 and 1913, but not for prior years. Rolled forging blooms and billets are also included for 1912 and 1913.

The following table gives by States the total rolled iron and steel production in 1913, as compared with the production in 1912, iron being separated from steel for 1913.

States—Finished rolled iron and steel.	1913—Gross tons.			Total in 1912.
	Iron.	Steel.	Total.	
Maine and Massachusetts	20,459	158,323	178,782	193,401
Rhode Island and Connecticut	20,880	57,724	78,604	81,410
New York	75,705	960,901	1,036,606	1,034,071
New Jersey	39,225	154,928	194,153	175,143
Pennsylvania	758,683	11,437,926	12,195,709	12,254,040
Delaware and Virginia	20,334	15,260	35,594	32,885
Maryland	2,700	331,391	334,091	284,617
West Virginia	2,120	559,409	561,535	591,333
Ky., Tenn., N. C., Ga., and Tex.	46,804	167,764	214,568	192,737
Alabama	2,200	537,971	540,171	533,247
Ohio	198,859	4,060,954	4,259,813	4,519,497
Indiana	224,583	1,911,582	2,135,965	1,953,256
Illinois	130,276	2,118,362	2,248,638	2,257,951
Michigan and Wisconsin	25,564	225,085	250,649	248,595
Missouri	63,174	10,322	73,496	82,543
Kansas, Colorado, and Wash.	21,080	388,709	409,789	476,052
California	25,803	27,275	53,083	57,494
Total	1,676,307	23,112,986	24,791,243	24,699,774

The production of all kinds of iron and steel rolled into finished forms in 1913 (including blooms, billets and axle blanks rolled for forging purposes and semi-finished products which were rolled for export in that year) amounted to 24,791,243 gross tons, against 24,656,841 tons in 1912, an increase of 134,402 tons, or a little over one-half of one per cent. The maximum production was reached in 1913.

Production by States from 1909 to 1913

The following table gives the production by States of all kinds of finished rolled iron and steel from 1909 to 1913, in gross tons. Rolled forging blooms and rolled forging billets are included for the five years, but semi-finished products rolled for export are included for 1912 and 1913 only.

States.	1909.	1910.	1911.	1912.	1913.
Me. and Mass.	169,855	171,782	157,448	193,401	178,782
R. I. and Conn.	120,922	121,065	73,788	81,410	78,604
New York	851,465	1,013,768	768,763	1,034,071	1,036,606
New Jersey	188,256	165,057	154,563	175,143	194,153
Pennsylvania	9,685,298	10,774,531	9,426,827	12,254,040	12,195,709
Delaware and Va.	38,392	36,806	30,487	32,888	35,594
Maryland	324,173	307,837	264,222	284,617	324,091
West Virginia	455,949	405,925	472,177	591,333	561,535
Ky. and N. Car.	155,006	173,653	115,370	115,264	140,494
Tenn., Ga., Tex.	60,986	61,497	71,779	77,473	74,074
Alabama	257,972	426,471	356,609	532,247	540,171
Ohio	3,174,908	3,228,223	3,382,063	4,330,487	4,259,813
Indiana	965,621	1,310,645	1,156,411	1,873,906	2,135,962
Illinois	2,378,500	2,547,662	1,939,350	2,253,664	2,248,638
Michigan	56,735	62,398	26,914	28,737	41,324
Wisconsin	264,369	242,777	121,371	218,254	209,325
Missouri	79,691	84,320	68,961	82,883	73,496
Kan., Col., Wash.	364,495	437,685	407,314	438,622	409,789
Wy., Ore., & Cal.	52,097	49,177	44,754	58,401	53,083
Total	19,644,690	21,621,279	19,039,171	24,656,841	24,791,243

Leading Articles of Rolled Iron and Rolled Steel

The following table gives the production of all forms of finished rolled steel from 1904 to 1913, as compared with the production of all forms of finished rolled iron for the same period. Rolled forging blooms and billets are included from 1905 to 1913, and semi-finished products rolled for export for 1912 and 1913. In early years rolled iron was separated from rolled steel, but in 1891 this separation was discontinued and was not resumed until 1904.

Articles—Gross tons.	1913—Gross tons.		
	Iron.	Steel.	Total.
Rails	.....	3,502,780	3,502,780
Plates and sheets	64,729	5,686,308	5,751,037
Nail and spike plate	5,044	32,459	37,503
Wire rods	832	2,463,975	2,464,807
Structural shapes	3,841	3,001,131	3,004,972
Merchant bars	1,026,632	2,930,977	3,957,609
Bars for reinforced concrete work	113	319,557	319,670
Skelp, flue, etc.	312,746	2,189,218	2,501,964
Long angle splice bars, tie-plate bars, etc.	46,574	639,816	686,390
Hoops	.....	280,886	280,886
Bands and cotton-ties	.....	499,660	499,660
Rolled sheet piling, not incl'd'ng fabricated.	.....	46,289	46,289
Railroad ties	.....	44,244	44,244
All other finished rolled products	217,343	850,101	1,067,444
Rolled forging blooms, forging billets, etc.	403	536,807	537,210
Exports of blooms, billets, sheet bars, etc.	.....	88,778	88,778
Total for 1913	1,678,257	23,112,986	24,791,243
Total for 1912	1,637,582	23,019,259	24,656,841
Total for 1911	1,460,615	17,578,556	19,039,171
Total for 1910	1,740,156	19,881,123	21,621,279
Total for 1909	1,709,431	17,935,259	19,644,690
Total for 1908	1,238,449	10,589,744	11,828,193
Total for 1907	2,200,086	17,664,736	19,864,822
Total for 1906	2,186,557	17,401,911	19,588,468
Total for 1905	2,059,990	14,780,025	16,840,015
Total for 1904	1,760,084	10,253,297	12,013,381

Rolled Products for 27 Years

The total production of iron and steel rails, plates, sheets, wire rods, structural shapes, nail plate, merchant bars and all other finished rolled products from 1887 to 1913 is given below. Rolled blooms and billets for forging purposes are included from 1905, while semi-finished products rolled for export are included for 1912 and 1913 only. Prior to 1892 structural shapes were grouped with bars, hoops, etc.

Years.	Iron and steel rails. Gross tons.	Plates and sheets, except nail plate.	Wire rods. Gross tons.	Structural shapes, not including plates.	Nail plate. Gross tons.	Bars, skelp, and all other forms.	Total. Gross tons.
1887	2,139,640	603,355	.....	.....	308,432	2,184,279	5,235,706
1888	1,403,700	609,827	279,769	.....	289,891	2,034,162	4,617,349
1889	1,522,204	716,496	363,851	.....	259,409	2,374,968	5,236,928
1890	1,885,307	809,981	457,099	.....	251,828	2,618,660	6,022,875
1891	1,307,176	678,927	536,607	.....	223,312	2,644,941	5,390,963
1892	1,551,844	751,460	627,829	453,957	201,242	2,579,482	6,165,814
1893	1,136,458	674,345	537,272	387,307	136,113	2,104,196	4,975,685
1894	1,021,772	682,900	673,402	360,305	108,262	1,795,570	4,642,211
1895	1,306,135	991,459	791,130	517,920	95,085	2,487,845	6,189,574
1896	1,122,010	965,776	623,986	495,571	72,137	2,236,361	5,515,841
1897	1,647,892	1,207,286	970,736	583,790	94,054	2,497,970	7,001,728
1898	1,981,241	1,448,301	1,071,683	702,197	70,188	3,239,760	8,513,370
1899	2,272,700	1,903,505	1,036,398	850,376	85,015	4,146,425	10,294,419
1900	2,385,682	1,794,528	846,291	815,161	70,245	3,575,536	9,487,443
1901	2,874,639	2,254,425	1,365,934	1,013,150	68,850	4,772,329	12,349,327
1902	2,947,933	2,665,409	1,574,293	1,300,326	72,936	5,383,219	13,944,116
1903	2,992,477	2,599,665	1,503,455	1,095,813	64,102	4,952,185	13,207,697
1904	2,284,711	2,421,398	1,699,028	949,146	61,601	4,597,497	12,013,381
1905	3,375,929	3,532,230	1,808,688	1,660,519	64,542	6,398,107	16,840,015
1906	3,977,887	4,182,156	1,871,614	2,118,772	54,211	7,383,828	19,588,468
1907	3,633,654	4,248,832	2,017,583	1,940,352	52,027	7,972,374	19,864,822
1908	1,921,015	2,649,693	1,816,949	1,083,181	45,747	4,311,608	11,828,193
1909	3,023,845	4,234,346	2,335,685	2,275,562	63,746	7,711,506	19,644,690
1910	3,636,031	4,955,484	2,241,830	2,266,890	45,294	8,475,750	21,621,279
1911	2,822,790	4,488,049	2,450,453	1,912,367	48,522	7,316,990	19,039,171
1912	3,327,915	5,875,080	2,653,553	2,846,487	45,331	9,908,475	24,656,841
1913	3,502,780	5,751,037	2,464,807	3,004,972	37,503	10,030,144	24,791,243

Number of Rolling Mills and Steel Works

The number of completed rolling mills and steel works at the close of 1913 was 657, located in 33 States, the District of Columbia and the Canal Zone, Panama, of which 569 were active during the year and 88 were idle. At the close of 1912 the number of completed works was 661, located in 33 States, the District of Columbia and the Canal Zone, Panama, of which 565 were active during 1912 and 96 were idle.

The number of works which were equipped with hot trains of rolls at the close of 1913 was 439, of which 379 were active during the year and 60 were idle. At the close of 1912 the number of plants which were equipped with hot trains of rolls was 445, of which 373 were active during 1912 and 72 were idle.

The number of steel plants which were not equipped with hot trains of rolls at the close of 1913 was 218, of which 190 were active during the year and 28 were idle. At the close of 1912 the number of steel plants which were not equipped with hot trains of rolls was 216, of which 192 were active during 1912 and 24 were idle.

In 1913 there were 14 rolling mills and steel plants added to the list of completed works, located in 8 States, of which 6 were equipped with hot trains of rolls and 8 were not, as follows: New Jersey, 1; Pennsylvania, 3; Maryland, 1; Virginia, 1; Ohio, 4; Illinois, 1; Michigan, 1; and Washington, 2. In 1912 the number of new rolling mills and steel works built was 29.

At the close of 1913 there were 10 rolling mills and steel works in course of erection, of which 6 were being equipped with hot trains of rolls and 4 were not being so equipped, as follows: New York, 2; Pennsylvania, 1; Alabama, 1; Ohio, 3; Minnesota, 1; Washington, 1; and Arkansas, 1. In addition at the close of 1913 there were 4 plants which were partly erected but upon which work had been temporarily suspended.

During 1913 there were 19 rolling mills and steel works abandoned or dismantled, located in 10 States, of which 14 were equipped with hot trains of rolls and 5 were not, as follows: New York, 2; Pennsylvania, 6; Delaware, 1; West Virginia, 1; Texas, 1; Ohio, 2; Indiana, 1; Illinois, 3; Wisconsin, 1; and Colorado, 1.

The Vilter Mfg. Company, Milwaukee, Wis., made a shipment of eight carloads of refrigerating machinery to the Sulzberger & Sons Company's branch house in Sao, Brazil, on August 13 and 14. The shipment included two 150-ton ice machines, Corliss engine, etc. A few days previous the Vilter Company shipped two carloads of ice machinery to Wellington, New Zealand.

MELTED FERROMANGANESE

Cost and Advantages of Using the Alloy in This Form

Any suggestions as to the economical use of ferromanganese are especially appropriate at this time when the supply is menaced by the European war. In Europe electric steel furnaces are being quite extensively used in melting ferromanganese. In an article in *The Iron Age* for September 12, 1912, entitled "Electric Melting of Ferromanganese," German experiences in melting the alloy in different furnaces were detailed, together with operating costs. It is claimed that the use of the fluid instead of the solid manganese alloy results not only in a saving in consumption but also in a better deoxidation and a better steel, which counterbalance the extra cost of melting.

The first plant to take up this practice in this country, according to Metallurgical and Chemical Engineering, was the Illinois Steel Company, which employs a 4-ton Heroult furnace at its converter plant at Joliet, Ill., to keep on hand a supply of molten ferromanganese from which 150 lb. are taken every seven minutes. It is stated that the experience of this company is not only a saving in alloy but a clear advantage in quality, the soft steel produced being decidedly better for wire purposes.

In a recent issue of the same journal the results obtained in three European plants, employing induction furnaces for melting ferromanganese, were given, a portion of which is reproduced as follows:

The three plants in question use for this purpose a 3-ton, 350-kw. furnace, a 4-ton, 500-kw. furnace, and a 4-ton, 500-kw. furnace respectively, all being of the three-phase, 50-period, three-ring Roechling-Rodenhauser type, the design of which is very well known. In the plant using the 3-ton, 350-kw. ferromanganese melting furnace, some 30 to 50 tappings, ranging each from 90 to 120 kg. (198 to 264 lb.), are made every 24 hours, depending upon the demands of the steel plant. For the first five weeks the average energy consumption, excluding the energy required for burning in the lining, was 721 kw.-hr. per ton for an output of 220 tons of ferromanganese. To maintain the furnace hot during long intermission 200 to 250 kw. are required.

As a result of using molten ferromanganese, an average saving of 30 to 40 per cent. of weight of ferromanganese required is recorded. With cold ferromanganese from 7 to 8 kg. are used per ton of steel and during a year some 2100 tons of cold ferromanganese are required. With molten ferromanganese this amount is reduced to less than 1400 tons, representing a saving of more than 700 tons, which at $55 per ton represents a saving of $38,500 per year.

In one of the plants with a 4-ton, 500-kw. furnace ferromanganese has been melted at the rate of 10 tons per 24 hr. with an energy consumption of 750 kw.-hr. per ton. The furnace, however, is capable of melting a considerably higher tonnage of ferromanganese per day and when the demand of the steel works increases it may be expected that the specific energy consumption will be reduced. At the same time the amount of ferromanganese used per ton of steel has been reduced at this plant from 7.5 or 8 kg. (for cold metal) to 4 kg. (for molten metal), which is a saving of from 45 to 50 per cent.

If the results of these two furnaces are used on which to base an estimate of the power requirement and savings to be expected in new installations, it seems safe to figure on a saving of 30 per cent. in weight of ferromanganese and a power consumption of 675 kw.-hr. per metric ton of ferromanganese for a 3-ton furnace in regular operation. For burning in the lining and heating up a 3-ton furnace about 3500 kw.-hr. are required and a life of 12 weeks, or 84 days of 24 hr., may be expected for the lining. From these data a figure for an additional small power consumption may be deduced. As stated, all these figures refer to induction furnaces. It would be interesting to get, for comparison, data from arc-furnace installations.

The use of molten ferromanganese has, however, additional advantages which cannot be stated as easily in figures. Owing to the rapidity with which molten ferromanganese becomes distributed through a steel charge much time is saved owing to the fact that the steel may be teemed at once. Further low-grade ferromanganese, containing a large percentage of fines, may be easily melted in an electric induction furnace.

That the quality of the steel is improved by the use of molten ferromanganese will be understood from the following considerations:

1. The deoxidizing effect is much stronger and more rapid than with solid ferromanganese, as the latter must first be dissolved and exerts a certain cooling effect. 2. As the ferromanganese is added to the steel while teeming, it does not come into contact with the slag, and rephosphorization by reduction of the phosphates in the slag is entirely excluded. 3. Frequent analyses in the three induction furnace installations in question have proved that the composition of the steel remains constant from the first to the last ingot for any one charge. 4. On account of the uniformity of the composition of each ingot due to the better distribution of manganese and also to the more complete deoxidation the steel "rolls" extremely well. It has been proven that a section which, when cold ferromanganese was used, could not be satisfactorily rolled with steel containing less than 0.4 per cent. manganese, can, when molten ferromanganese is used, be rolled easily from steel containing only 0.29 per cent. manganese. 5. The amount of ferromanganese per ton of steel can be considerably reduced on account of the certainty that the total amount of ferromanganese added is utilized and nothing is retained in the slag or remains undissolved in the steel. 6. The contents of the ladle can be poured at once whereas much time is saved and, moreover, the charge need not be so hot from the start so as to be able to heat the ferromanganese to melting temperature. The liquid steel remains completely quiet, does not boil, and can be poured very satisfactorily.

The lining is put into ferromanganese induction furnaces in about the same way as in steel furnaces; that is, a mixture of magnesite, or dolomite, with tar is rammed in hot. But because the temperature required is not so high as for steel and also because ferromanganese is usually in particularly convenient form for melting in an induction furnace, the life of the lining is much prolonged. From the results so far obtained it is thought possible when working continuously to average between four and five renewals per year, or even better.

No slag is required. The molten metal is effectively protected from oxidation by a layer of carbon in the form of petroleum coke. The metal being saturated with carbon, no alteration in composition occurs. The fact that such a covering is used proves that the atmosphere in the furnace is non-oxidizing.

While, as stated before, the Roechling-Rodenhauser type of combination induction furnace is used in the three installations here discussed, the Siemens & Halske Company, which made these installations, has developed more recently an improved type of induction furnace which combines the good points of the Kjellin, Roechling-Rodenhauser and Frick types, and with which it has been possible to reduce the specific energy consumption still further.

The Erie Foundry Company, Erie, Pa., has just installed two 4000-lb. blow steam drop hammers at the plant of the Maxwell-New Castle Mfg. Company, New Castle, Ind., and recently booked an order for considerable additional galvanizing equipment for the Newport Rolling Mill Company, Newport, Ky. The company is now installing two complete galvanizing plants, including cooling and pickling apparatus, for the Trumbull Steel Company, Warren, Ohio, making six units installed for this company.

OBITUARY

THOMAS A. GRIFFIN, chairman of the board of directors of the Griffin Wheel Company, died on the steamer Korea en route from Yokohama, Japan, to Honolulu, H. I., August 12. He was completing a trip around the world on which he started from New York January 13, 1914. He was born in Rochester, N. Y., August 28, 1852, and had been in the carwheel manufacturing business continuously since 1868. In 1875 he went from Rochester to Detroit, Mich., where he engaged in the carwheel business with his father, the late Thomas F. Griffin. In 1880 he removed to Chicago and organized the Griffin & Wells Foundry Company, which in 1886 was merged into the Griffin Wheel & Foundry Company and later the company's name was changed to the Griffin Wheel Company. From the original one plant in Chicago have grown three foundries in Chicago as well as operating foundries in Boston, Detroit, St. Paul, Denver, Kansas City, Tacoma and Los Angeles. While occupying the position of chairman of the board of directors of the Griffin Wheel Company, Mr. Griffin has not been active in its management for some years. He was a member of clubs in various cities and of the Iron and Steel Institute, London, England. He leaves a son, George Francis Griffin, a vice-president of the company, and a daughter, Mrs. Carl P. Dennett, Boston, Mass.

JACOB LANGELOTH, chairman of the board of directors of the American Metal Company, 52 Broadway, New York, died suddenly of heart disease August 14, at his country home, near Greenwich, Conn., aged 62 years. He was born in Mannheim, Germany, and was formerly a captain in the German army. Mr. Langeloth was vice-president and director of the Balbach Smelting Company, and a director in the Corn Exchange Bank, General Development Company, Metallurgical Company of America, Mexican Bank of Commerce and Industry, Miami Copper Company, and Wetherill Separating Company. He leaves a widow.

CHARLES WEBSTER DANFORTH, New York manager of the Pittsburgh Bridge & Iron Works, while on his way to Moosehead Lake, Me., for his health, died of heart failure, August 9, in the Grand Central Station, New York. His wife was with him at the time. Mr. Danforth, who was 40 years old, lived at East Orange, N. J., and had been ill for some time. He was born in New Haven, Conn., was graduated from Yale in 1896 in the Sheffield Scientific School, and was a civil engineer. Before taking his last position he was connected with the American Bridge Company. He belonged to the Yale Club.

FRANCIS H. NYE, secretary and treasurer of the Eckels-Nye Steel Company, Syracuse, N. Y., died August 12, at a local hospital, from cirrhosis of the liver, aged 49 years. He was a native of Syracuse, and his connection with the steel business began in 1885 when he became an employee of the Sweet's Mfg. Company, working up from timekeeper to secretary and treasurer. In 1899 the Eckels-Nye Steel Company was organized, with Mr. Nye as secretary and treasurer, holding the position ever since. He had charge of the office affairs of the company. He leaves a widow.

VICTOR A. HARDER, active in many business enterprises, died August 9 at his home in Brooklyn, N. Y., aged 68 years. He was born in New York City, was founder and head of the Victor A. Harder Realty & Construction Company, president of the Powhatan Brass & Iron Works, Ransom, W. Va., and was a director of the Connecticut Tobacco Corporation and other concerns. He was founder and former president of the Essex Foundry, Newark, N. J., of which a son, George A., is now president. He leaves a widow, two sons and two daughters.

JOHN P. HOLLAND, inventor of the Holland submarine boat, died at his home in Newark, N. J., August 12, aged 72 years. He was born in Ireland. He was a school teacher when the Merrimac and Monitor fought their famous battle during the Civil War. It was this engagement that set him thinking about a submarine. He leaves a widow, three sons and one daughter.

WILLIAM H. HALL, vice-president of the Richmond Iron Works, Richmond Furnace, Mass., died at his home in Springfield, Mass., August 5, aged 59 years. For 18 years, up to 1905, he was general manager of the George H. Gilbert Mfg. Company, Ware, Mass. He leaves a widow and a daughter.

T. MORRIS BOX, one of the trustees of Alfred Box & Co., Philadelphia, died at his home in Jenkintown, Pa., August 8, aged 36 years. He had charge of the drawing room and shop.

Book Reviews

American Machinists' Handbook. By Fred H. Colvin and Frank A. Stanley, associate editors of the American Machinist. Pages, 673, 4 x 6¾ in.; profusely illustrated. Published by the McGraw-Hill Book Company, Inc., 239 West Thirty-ninth street, New York City. Price $3, net.

In bringing out the second edition of this reference book of machine shop and drawing room data, methods and definitions, the book has been thoroughly revised and considerably enlarged, there being 160 pages more than in the first edition, which was issued in October, 1908. The changed and changing conditions of shop and drawing room work have received consideration in the revision and a number of the changes which have been made were due to suggestions made by users. In the main the book follows the arrangement of the previous edition and deals with the subjects of threads, drills, taps and dies, work benches, soldering, gearing, milling cutters, grinding and lapping, screw machine tools and speeds and feeds, tools for punch presses, bolts, nuts and screws, tapers and dovetails, shop and drawing room standards, wire gauges and stock weights, power and its transmission, heat treatment of steels and the properties of various metals, steam hammers, knots and slings for handling work, general reference tables, shop trigonometry and a dictionary of shop terms. A number of these sections are subdivided and the titles of the sections of these subdivisions as well as those main classifications which are not subdivided, appear in the table of contents. The dictionary of shop terms occupies some 92 pages, and in addition to definitions contains a large number of illustrations. The index which is very complete follows the dictionary and a list of authorities with references to the pages on which they are quoted completes the book.

A technical dictionary of the German and English languages has been issued by the C. N. Caspar Company, Milwaukee, Wis., which contains the most important words and terms in general use during the last few decades. The book has 264 pages, 4¾ x 6¼ in. in size. It is divided into two parts, the English-German dictionary forming the first and the German-English the second. The price is $1 net.

The Erie Bolt & Nut Company, Erie, Pa., will begin about September 1 to manufacture machine bolts, mill body bolts, coupling bolts, studs, cold punched nuts, semi-finished nuts and specialties in these lines. This company, of which Lincoln Davis is president, is capitalized at $100,000 and has just completed a new plant, a 60 x 212 ft. one story, brick and steel, trussed-roof clear-span building. All machinery is electrically driven.

Considerable progress is being made at the plant of the Armstrong-Whitworth Company at Montreal. It is expected that the company will commence early in the fall on the manufacture of twist drills, shear blades, milling cutters and general small tools. It will also manufacture for the Canadian market the high grade of crucible steel from which all its miscellaneous shop tools will be made.

The Machinery Markets

The opinion that the shock to business caused by the European war will eventually give way to boom times is fast becoming a conviction. For the present conservatism prevails and most industrial extensions have been abandoned and in a number of cases operations are carried on with reduced forces. An impetus has already been felt in certain lines. New England machinery manufacturers as a rule are suffering greatly from the loss in foreign trade; but textile machinery makers are at this early date preparing for a sudden and heavy demand. The New York market, along with several others, is keenly interested in the recent list of the Chesapeake & Ohio Railroad for some forty machine tools. Much hope is expressed that this is the forerunner of more good business. In Chicago an exceptional demand is expected to follow the present marked conservatism; and here, too, the textile machinery manufacturers are expected to lead off. Detroit still holds to a minimum of actual business, as the present crisis abroad has added its retarding effect to an already deadened market. Loss of trade during the conflict is not as much feared in Milwaukee, as is the shutting off of the supply of necessary raw materials. A slight improvement in business is noted there. At Cincinnati belated orders just received from Europe for machinery emphasize the fact that the machine tool trade, which is now practically dead there, must sooner or later face a strong demand when transportation to other countries is once more restored. Throughout the South the limited domestic market for cotton has halted all business, at least for some time. In the Louisville district curtailment of manufacturing is the rule. Birmingham business men are not pessimistic, neither are they sanguine. Texas is waiting for the opportunity to again sell goods in Mexico. Along the Pacific coast the export trade has been almost entirely suspended, although some machinery shipments have been made to the Orient on Japanese liners. The heavy requirements for Alaska are stiffening the market in this section.

New York

NEW YORK, N. Y., August 19, 1914.

The purchasing agent of the Chesapeake & Ohio Railroad, Richmond, Virginia, has before the trade a list of about 40 machine tools and miscellaneous railroad shop equipment. The list was made known but a few days ago and only a short time allowed for estimates, inasmuch as some of the bids were to be submitted August 17 and others today and the balance August 22. Delivery is to be f.o.b. at the company's line. Included in the machinery required are several lathes, grinders, turret lathes, drilling machines, hammers, multiple punches, planer, punch and bender, coping machine, coal and ash handling machinery, hydraulic flanging press, carwheel press, vertical milling machine and boilers. The appearance of the list and the indications of prompt action at once improved the feeling of the trade inasmuch as it raised hope that, with the example set, other railroads would take action on machinery they are known to need, despite the postponement of buying by the Seaboard Air Line, which was referred to a week ago.

The Turl Iron & Car Company, New Windsor, N. Y., has been incorporated by C. F. Stafford, Hackensack, N. J.; J. H. Turl and William Dyke, Newburgh, N. Y., with a capital stock of $100,000 and has purchased the assets of John Turl's Sons, Inc., 55 Liberty street, New York City. The new company will continue to manufacture the lines of the John Turl's Sons, consisting of structural iron and steel, heavy hardware and machinery.

The Sugar Factories Construction & Equipment Corporation, 82 Beaver street, New York City, has been incorporated with a preliminary capital stock of $7000 by H. C. Lakin, Scarsdale, N. Y., and others for the special purpose of constructing complete sugar factories, including the machinery equipment. H. B. Bradford, Edgemoor, Del., is president.

The city of Westfield, N. Y., has voted to issue $7100 of bonds for repairs and improvements to the municipal electric light plant.

The New Process Gear Corporation, Syracuse, N. Y., is taking bids for a case hardening building, 36 x 95 ft., three stories and basement, to be erected on Plum street. T. W. Meachem is president.

The foundry of the Starbuck Foundry Company, Center Island, Cohoes, N. Y., was badly damaged by fire last week with a loss of $20,000. Repairs will be made at once.

The Blendoid Company, Poughkeepsie, N. Y., has filed articles of incorporation with a capital stock of $100,000, and will engage in the manufacture of buttons, toilet articles, etc., from wood, bone and other materials, and will equip a factory. W. P. Coe, Lyndhurst, N. J., and J. Goldberg and A. S. Mortimer, New York City, are the incorporators.

The Ernest Simons Mfg. Company, Port Chester, N. Y., manufacturer of bath robes, etc., has completed plans for a two-story addition which it will make to its factory.

Driscoll Brothers, Ithaca, N. Y., are building a three-story and basement addition to their planing mill.

The J. M. Peters' Sons Lumber Company, Bleecker, N. Y., has purchased a site and will erect a woodworking shop, 40 x 100 ft.

The Pratt & Lambert Company, Buffalo, varnish manufacturer, is adding a one-story brick factory to its plant on Tonawanda street and the New York Central Railroad.

The Schopp Mfg. Company, Inc., Buffalo, N. Y., has been incorporated to manufacture jewelry, watches, fancy ornaments, etc. C. and I. M. Schopp and G. H. Wieland are the directors. The capital stock is $25,000.

The Sterling Engine Company, Niagara street and Auburn avenue, Buffalo, has let the contract for building an addition to the testing room at its plant.

The Cartondale Machine Company, 50 Church street, New York City, is low bidder, at $16,300, for installing refrigeration equipment in the mess hall and kitchen building at the Great Meadow Prison, Comstock, N. Y. John B. Riley, superintendent of states prisons, Albany, N. Y., is in charge.

The committee of public buildings, Newark, N. J., will receive bids until 4 p. m., August 26, for installing a new boiler and apparatus.

Arthur Starr, city clerk, Woodbury, N. J., will receive bids until 7.30 p. m., August 25, for a pumping station, etc.

New England

BOSTON, MASS., August 18, 1914.

Business men generally see no reason to change the opinion noted a week ago that the country is in for a period of much better industrial conditions. The change has not shown itself as yet in a tangible form; the time is one of readjustment to circumstances which naturally overthrew every preconceived idea of what the manufacturers of the United States had reason to expect. The machinery people are finding things very dull indeed, the domestic demand having increased very little and the loss of foreign business having created a void which it may take some little time to fill. In many other lines the cutting off of the European export trade is felt somewhat seriously. Of course this is inevitable, but the period of readjustment should not be long, according to most of the experienced observers. They qualify their statements, however, by calling attention to the fact that no precedent exists upon which to base any really reliable estimate.

The Penn Metal Company has purchased an entire block of land in Cambridge, Mass., bounded by Sixth, Binney and Monroe streets, and proposes to erect a group of factory buildings and storehouses on the premises. The material will be reinforced concrete and the buildings will be fireproof throughout. The plant will be, it is stated, the largest east of Pittsburgh for the manufacture of sheet metal and iron fireproof building materials. G. A. Sagendorph, Boston, is the president, F. M. Johnson, vice-president, and J. P. Dolan, secretary.

The H. Jacobs & Sons Company, Norwalk, Conn., plans to erect an addition to its shoe factory at a cost of $40,000.

The W. H. Miner Chocolate Company, Springfield, Mass., will erect a factory on land recently purchased for the purpose.

The Covel Machine Company, Fall River, Mass., has gone out of business after 45 years of existence under the management and ownership of Benjamin F. Covel.

F. A. Giroux, Lubec, Maine, will erect a machine shop.

The Wise-Wood Press Company is making preparations for establishing its shops in the building of the Mason Machine Works, Taunton, Mass.

The announcement is made in local press that the plant of the Woonsocket Machine & Press Company, Woonsocket, R. I., has changed ownership and will be used for the building of printing presses.

The Fore River Ship Building Corporation, Quincy, Mass., has been awarded the contract for the building of the submarine, the governmental contract for which was given the Electric Boat Company. The Fore River plant will build the craft complete with the exception of the engine, the price being about $500,000.

The stockholders of The Bristol Brass Company, Bristol, Conn., has recently received a pro rata share of the stock of the American Silver Company to the amount of $200,000. The Bristol Brass Company held this stock and voted to distribute it on the basis of about one share of American Silver Company stock to each four held in the Bristol Brass Company. The former stock is valued at $25 a share.

Four buildings of the paper manufacturing plant of F. W. Bird Sons, Walpole, Mass., were burned August 9 with a loss of about $150,000. The manufacturing buildings were saved.

Philadelphia

PHILADELPHIA, PA., August 17, 1914.

The Keystone Lantern Company, 5033 Portico street, Philadelphia, is having plans prepared for a four-story brick factory to be erected at Cottman street and Tacony road. Bids will be asked in 10 days. W. E. S. Dyer, Land Title Building, Philadelphia, is the architect.

As soon as the proposed site of the municipal sewage disposal plant has been properly filled, bids covering its construction will be called by the city authorities, Trenton, N. J. The approximate cost will be $1,000,000.

The city of Hancock, Md., has voted to issue $30,000 of bonds for the erection of a waterworks.

The Town of Rising Sun, Md., has authorized the issuance of bonds for the construction of a municipal electrical plant and waterworks.

The Dix Mfg. Company, 1021 Guilford avenue, Baltimore, Md., will erect a two-story factory and warehouse, 120 x 126 ft., of reinforced concrete, at the corner of Eager and Concord streets. C. M. Anderson, 324 North Charles street, Baltimore, is the architect. The cost will be about $25,000.

The Phillips Can Company, Cambridge, Md., is building a two-story brick and concrete factory, 50 x 150 ft., to cost about $25,000.

H. L. Davis, Rocky Mount, Va., is planning the establishment of a spoke and handle factory. Woodworking and power equipment will be needed.

The Virginia Mfg. Company, Suffolk, Va., is having plans drawn for a factory to be used in the manufacture of butter plates, crates, etc. It will need rotary machines, saws and other woodworking machinery, as well as a power plant. A machine shop for repair work will also be equipped. The company is replacing a factory which was recently burned.

Chicago

CHICAGO, ILL., August 17, 1914.

The prevailing sentiment among manufacturers for the immediate future is one of decided conservatism, and in all lines of machinery manufacture the effects of temporary curtailment are being felt. Just as is discovered under many other circumstances, the importance, desirability and need of the export trade to our machinery interests are now being realized in full measure when it is cut off. Associated with the present disposition on the part of trade to go slow there is a prevalent and predominating opinion that our manufacturers are to be called on for materials to an extent that will mean exceptional prosperity, and there are some who see already evidences of this. One Chicago sales interest reports that last week orders aggregating a value of $10,000 in tools, and which have been hanging fire for a year, were closed. One direction from which an early demand may be expected is the manufacture of textile and shoe machinery. Our first and probably largest exports of manufactured goods to meet the needs of Europe and other markets will be in the form of wearing apparel fabrics and the manufacturers of these goods should be active buyers of new equipment.

The city of Chicago has begun the work of building the municipal machine shop and foundry at 3100 South Sacramento street. The work is in charge of the construction bureau of engineering, city engineer's office.

The American Pattern & Model Company, Chicago, is building a two-story factory, 60 x 124 ft., at 2055 Walnut street, at an estimated cost of $14,000.

The Jungel Veneer Press Company, Chicago, has been incorporated with a capital stock of $1200 to manufacture castings, implements, tools, etc. The incorporators are Michael Jungel, George A. Schneider and Frederick K. Gustin. George A. Schreider, 1027 New York Life Building, Chicago, should be addressed.

The Whiting-Evans Mfg. Company, Chicago, has been incorporated with a capital stock of $100,000, by Harry Turner, Herbert R. McPherson and Fred Freer. The company will manufacture, buy, sell, export, import and deal in machinery, engines and tools.

The commissioners of Pekin, Ill., will receive bids until 2 p.m., August 26, for an electrically driven drainage pumping plant, including one 36-in. and one 20-in. motor-driven centrifugal pump. The Harman Engineering Company, Peoria, Ill., is in charge.

The town of Farmington, Ill., will soon be ready to receive bids for the building and equipment of an electric light plant.

The Cyclone Fence Company, Waukegan, Ill., is adding a one-story building, 50 x 80 ft., to its plant, to be used as a galvanizing department. Equipment for this purpose will be installed.

The Kise Electric Company, Peoria, Ill., has completed plans for the erection of a three-story factory, to be 100 x 250 ft. Machinery purchases for the equipment of this plant will include a full line of machine tools.

H. R. Budd, Bunker Hill, Ill., announces that the financing of an electric line from Mattoon, Ill., to St. Louis has been completed and that work on power houses and line will begin at once.

The Cummins Motor Car Company, Harrisburg, Ill., has been incorporated with a capital stock of $25,000 by Oscar O. Cummins, T. Y. Gregg and H. R. Walker to equip a machine shop, repair plant and garage.

Jansen & Zoeller, Inc., Pekin, Ill., has been incorporated with a capital stock of $30,000 to equip a plant for the manufacture of building materials.

The Rudolph Shoe Machinery Company, Streator, Ill., has been incorporated with a capital stock of $25,000 by Carlos Ames, R. H. Rudolph and W. C. Jones to engage in the manufacture of shoe factory machinery.

The Galesburg Writing Machine Company, Galesburg, Ill., has increased its capital stock from $100,000 to $150,000 to enlarge its factory equipment.

The Iowa Gate Company, Cedar Falls, Iowa, has started the construction of its new factory, 120 x 460 ft., one story, brick and tile construction, to have a capacity of 750 to 1000 gates per day. Most of the new machinery is of special design and will be built by the company itself. The total expenditure will be about $65,000.

Indianapolis

INDIANAPOLIS, IND., August 17, 1914.

The Indiana Steel & Wire Company, Muncie, Ind., will install another boiler unit, to consist of either two 250-hp., two 300-hp., one 500-hp. single unit or one 600-hp. single unit water-tube boiler, to be equipped with stokers.

Owing to the growth of its business, the Metzger & Wright Company, Lafayette, Ind., has leased new quarters for the machine shop and will install new machinery.

The car repair shops of Swift & Co., Elkhart, Ind., were destroyed by fire with an estimated loss of $50,000.

The Municipal Sanitary Devices Company, Plymouth, Ind., has been incorporated with $50,000 capital stock, to manufacture machinery and tools. The directors are Charles L. Talbot, Charles W. Pyne and Robert H. Grotefeld.

The Indianapolis Chair & Furniture Company, Aurora, Ind., has been incorporated with $50,000 capital stock, to manufacture furniture. The directors are W. J. Neukom, Indianapolis, and W. L. Hoskins and C. B. Wilson, Aurora.

Three buildings, including the engine room, of the St. Paul Pulley Works, Ft. Wayne, Ind., were burned August 10, with a loss of $50,000. The company recently abandoned the making of pulleys and changed to kitchen cabinets.

The P. H. Reddington Mfg. Company, Evansville, Ind., has been incorporated to manufacture furniture. It has $50,000 capital stock. The directors are P. H. Reddington, J. W. Schimmelman and W. Knerr.

The National Motor Vehicle Company, Indianapolis, manufacturer of automobiles, has increased its capital stock from $250,000 to $600,000.

The Community Ice Company, Indianapolis, has been incorporated with $125,000 capital stock. It will build a plant. The directors are Carl D. Spencer, Harvey B. Stout, Jr., and Wm. G. S. Herider.

The Mais Motor Truck Company, Indianapolis, has decreased its capital stock from $1,000,000 to $200,000.

Andy's Gas & Oil Engine Starter Company, Laporte, Ind., has been incorporated with $10,000 capital stock to manufacture engine starters. The directors are J. A. Wanbough, L. V. Barcus and R. F. Small.

Detroit

DETROIT, MICH., August 17, 1914.

Trade conditions have not materially changed the past week. The war situation is of course having an effect on business in general. The local machinery market has not been affected to any great extent, partly because the market for some time past has been so limited. There seems to be no prospect of any immediate curtailment of the production of automobiles but caution is being displayed in the purchase of equipment and supplies by the motor car industry. Some single tool purchases are reported and there is a fair amount of miscellaneous inquiry before the trade. New construction work continues to show a steady decrease.

The Detroit Starter Company, Detroit, has been incorporated with $20,000 capital stock, to manufacture automobile starters and other accessories. The incorporators are Alonzo B. Porter, John U. Fitzgerald and Joseph Lamb.

The Spranger Rim & Wheel Company, Detroit, has been incorporated with $100,000 capital stock by Nicholas M. and Frank Spranger and C. J. Dittmer. It will engage in the manufacture of automobile wheels.

The Detroit Vibrator Company, Detroit, has been incorporated with a capital stock of $15,000 for the manufacture of electric devices. Thomas E. Gibson, Francis M. Reigal and Mortimer V. Smith are the principal stockholders.

The K. C. B., Detroit, has been incorporated with a capital stock of $200,000 by John H. Chambers, Charles H. Bennett and Augustus A. Leslie. The company, which will manufacture carburetors and other automobile accessories, will take over the business of the Chambray Carburetor Company.

The Benham Mfg. Company, Detroit, manufacturer of automobile steering wheels, has increased the capital stock from $45,000 to $65,000.

The Hardie Mfg. Company, Hudson, Mich., manufacturer of power pumps, gasoline engines, etc., has increased its capital stock from $80,000 to $100,000, to provide for increasing business.

The Besser Mfg. Company, Alpena, Mich., has purchased the plant of the defunct Alpena Motor Company at receiver's sale. The Besser Company, which manufactures concrete mixing machinery, will operate the factory as an addition to the present plant.

The taxpayers of Bedford, Mich., have voted to bond for $15,000 for the construction of a waterworks plant.

The plant of the Strauble Mfg. Company, Saginaw, Mich., which was recently destroyed by fire, will be immediately rebuilt. The company manufactures timber products.

The Spencer-Smith Machine Company, Howell, Mich., is erecting an addition to its plant, 40 x 100 ft., one story.

The Blodgett Rubber Company, Warren, Ohio, has completed negotiations for the removal of its plant to St. Joseph, Mich., where a large factory has been secured. The company is a $500,000 corporation and manufactures inner tubes for automobiles.

The Monroe Motor Company, Flint, Mich., has been incorporated with $250,000 capital stock to manufacture automobiles. R. F. Monroe, U. C. Durant and A. B. C. Hardy are among the incorporators. It has acquired the plant of the Imperial Wheel Company.

The Dugas Motor Car Company, Menominee, Mich., has purchased a site for the proposed $25,000 garage and machine shop building, plans for which are now being prepared. It will be of brick, steel and concrete, two stories and will contain a full shop equipment.

The report that the Flint Electric Company, Flint, Mich., has plans for the erection of a small power plant at Fenton, Mich., is in error. No such plan has been formulated by the company.

The North American Construction Company, Bay City, Mich., maker of portable houses, will erect a factory 750 ft. long, containing 100,000 sq. ft. of floor space.

Milwaukee

MILWAUKEE, WIS., Aug. 17, 1914.

The uneasiness which overtook the machinery trade immediately after the beginning of hostilities in Europe has been considerably minimized by the slight improvement in domestic and local business. By some the loss of trade during the conflict is held to be not so serious as the inability to get raw and finished materials from abroad. There is no denying the fact that the European imbroglio has affected industry and trade all along the line, but this is believed to be only temporary, and its influence is already said to be passing. The past week has seen the development of a little business which has been in abeyance. Expectations for new business during the coming few weeks are only fair.

The West Bend Aluminum Company, West Bend, Wis., is moving into its new factory, which is considered most typical of fireproof construction. The shop is 50 x 250 ft., one and two stories, with a power plant, 40 x 50 ft. It was erected by the Appleton Construction Company, Appleton, Wis. The aluminum company is now employing more than 50 hands and has an investment of $100,000. The principal product is kitchenware.

The Mitchell-Lewis Motor Car Company, Racine, Wis., announces that it has negotiated a loan of $700,000 on a five-year basis to take care of its current financial needs and is now in the strongest financial position it has ever occupied.

The General Appliance Company, Marinette, Wis., has filed a petition in bankruptcy and Horace C. Baker has been appointed receiver. The liabilities are about $45,000 and the chief creditor is A. C. Merryman, who reorganized the company after its failure while operated by George W. Price.

The Beijer Hydraulic Transmission Company, Stevens Point, Wis., is now operating on a small scale, producing a large number of demonstrating models of automobile transmission systems operated by oil. It is the intention of the company to license automobile manufacturers but produce a limited number of systems for its own market.

The Cigar Box Lumber Company, Sheboygan, Wis., is having plans prepared by C. F. Ringer & Son, Milwaukee, Wis., for a mill and factory plant, 60 x 140 ft., two-story and basement.

Edward A. Kickhaefer, Milwaukee, who recently established the Kickhaefer Mfg. Company, 199-201 Oregon street, die and stamp maker, is enlarging the works to accommodate the increasing business, especially in stamped automobile engine parts, stamped manufactured articles and sheet metal tanks.

The Giddings & Lewis Mfg. Company, Fond du Lac, Wis., which has just undertaken the production of the new Conradsen rapid semi-automatic chucking machine, is also producing a new Conradsen device, known as the hydraulic shipping machine, for use on heavy work in railroad and machine shops. A splendid run of orders on both new machine types is reported and the Fond du Lac foundry is running on a 24-hour schedule.

The Aluminum Specialty Company, Manitowoc, Wis., which has been occupying all three floors of the Glober Building, York and North Sixth streets, has decided to build a factory, 60 x 200 ft., on a site just purchased at Sixteenth and Wollmer streets. It will be of brick and steel. Walter Spindler is secretary.

Fire in the casehardening department of the Killen-Strair Mfg. Company, Appleton, Wis., manufacturers of gas tractors, caused about $2000 damages. Repairs are being made and operations were but slightly interrupted.

William Koehler and Frank Zettler, Marshfield, Wis., have formed a partnership to conduct a garage and machine shop in the new fireproof building under construction for Mr. Koehler. The business will be known as the Independent Garage and will specialize in general machine work.

The new mill of the Rib Lake Lumber Company, Rib Lake, Wis., was destroyed by fire with an estimated loss of $50,000.

Plans for a $55,000 manual training school building at Menominee, Mich., are being prepared by Derrick & Hubert, Marinette, Wis., and Menominee, architects. The building will be 48 x 200 ft., three stories, with a 65 x 80-ft. wing. Bids will be taken by the Menominee board of education about Sept. 1.

The Montello & Harrisville Electric Light & Power Company, Montello, Wis., has been incorporated with a capital stock of $40,000. The incorporators are D. W. McNamara, L. M. McNamara, C. R. McNamara, Vincent McNamara and L. G. Miller.

The Northwestern Bridge & Iron Company, Milwaukee, Wis., has increased its capital stock from $5000 to $25,000.

The Wisconsin Light, Power & Milling Company, Eldorado, Wis., has broken ground for its new plant, to cost $10,000. Oscar A. Huelsman, Fond du Lac, is president.

The Northwestern Bridge & Iron Company, 127 South Water street, Milwaukee, Wis., has increased its capital stock from $5000 to $25,000 and will extend its operations.

The Volksfreund Publishing Company, Appleton, Wis., is having plans prepared for a $75,000 printing and publishing plant at Washington and Morrison streets. Richard J. Meyer is business manager.

Cincinnati

CINCINNATI, OHIO, August 17, 1914.

It was somewhat grimly amusing to a few local machine-tool builders to receive orders from Europe last week that were dated before war was declared between the principal countries involved. These communications filtered through the mails in some way. Machine-tool manufacturers, as a rule, believe that the European imbroglio will eventually aid this country to extend its export trade, but during the present period of readjustment to new conditions they have probably been worse hit than any other manufacturing line. As a consequence, forces are being gradually reduced, and several plants have been added to the list of idle ones.

A strong effort is being made to obtain business in Spanish America for Cincinnati houses by the Cincinnati Chamber of Commerce, of which W. C. Culkins is secretary. Cablegrams have been sent to consuls at all important points asking for information as to imports, and in this campaign the association has the hearty support of all local manufacturers, especially from those who realize the error of not previously investigating this particular field.

One encouraging feature of the situation is an apparent tendency on the part of a few railroads to come into the market, and the following is a partial list of machine tools wanted by the Chesapeake & Ohio Railway Company upon which bids are to be in by August 22:

One staybolt drilling machine.

One joining and buzz planing machine.

One universal saw bench.

One 36 to 42-in. motor-driven band sawing machine with solid wheel on bottom.

One 1½-in. rivet or forging machine.

One 500-lb. hammer.

One double-head axle turning lathe to take 70-ton car axles.

One 42-in. carwheel boring mill.

One riveting and cutting machine for stripping and riveting coupler yokes.

Domestic business in almost all manufacturing lines has been adversely affected by the war, but already there are signs of an early return to more normal conditions. An exception to the general rule is to be noted in the activity of boiler and tank makers, who are operating with a full force and on full time. A few small jobbing machine shops are also very busy, but on work of a special character.

C. V. Hargitt, 301 Bell Block, Cincinnati, is interested in a new company that will build a soap factory in one of the suburbs at an early date. The name of the proposed company is the Cleansinpowder Chemical Company.

The Donaldson Art Metal Sign Company, Court and Sycamore streets, Cincinnati, has had plans prepared for a factory to be erected on Banklick road.

The city of Covington, Ky., will soon be ready for bids on the extension of its waterworks system, plans for which will be made up at an early date. The proposed improvements will involve an expenditure of $200,000.

The Kenton Motors Company, Covington, Ky., has been incorporated by E. J. Rouse and others, with $10,000 capital stock. No information is now available as to the company's plans.

The American Cone & Wafer Company, Dayton, Ohio, has been incorporated with $350,000 capital stock by Alexander McLaren and others. It will operate a factory for the manufacture of ice-cream cones.

The new plant of the Springfield Brass Company, Springfield, Ohio, has been completed and the necessary machinery is being installed.

The Kelly-Springfield Motor Truck Company, Springfield, Ohio, has lately received an order for 1000 motor trucks from the National Pure Water Company, Kansas City, Mo. The company expects to deliver these at the rate of 100 a month.

The city of Columbus, Ohio, expects to install a chemical plant for the manufacture of alum that is used in connection with the waterworks purification plant.

The Vulcan Foundry & Machine Company, Charleston, W. Va., will rebuild its plant, recently badly damaged by fire.

The municipality of Wellsville, Ohio, expects to erect a garbage disposal plant. M. C. Tarr is president of the board of health.

It is reported that the Urbana Light Company, Urbana, Ohio, will enlarge its plant some time this fall.

H. H. Shirer, secretary of the building committee, Columbus, Ohio, will receive bids until 2 p. m., August 29, for pumps, boiler, etc., for a well house, for Marysville, Ohio.

The city of Maumee, Ohio, has voted $56,000 of bonds for the construction of a municipal water system.

The Central South

LOUISVILLE, KY., August 17, 1914.

Machinery business seems to have slowed up the past week, largely as the result of the adoption of an ultra-conservative attitude by business men as the result of the war abroad. While financial conditions seem to be sound the possibility of a shortage of money is being taken into account, and prospective machinery buyers are not inclined to incur new obligations. On the other hand, those with available capital, who have been contemplating manufacturing enterprises, are turning in many cases to the more attractive speculative opportunities offered by the purchase of farm products and other staples. This has hurt business in several specific instances, it is reported. Automobile garages continue to be established, taking a satisfactory amount of machine tools. Electrical power equipment, especially in the smaller units, is also moving well.

The Louisville Soap Company, Louisville, is having plans drawn by Frederick Erhart for a three-story factory to cost $50,000. Two 300 hp. water tube boilers will be purchased, in addition to pumps, tanks, etc. A hydraulic elevator will also be needed.

The report that the Multiplex Register Company, Louisville, which was recently organized, had purchased the factory of the Stenotype Company at Owensboro, Ky., is denied by officers of the former company.

The Louisville Chemical Company, Louisville, will purchase a boiler, six steam kettles and an electric elevator.

The plant of the Kentucky Paint Mfg. Company, 513 West Market street, Louisville, was damaged recently to the extent of $1200 by fire. A 10 hp. motor and paint mixers and mills were among the equipment involved.

The Louisville & Nashville Railroad Company will build and equip a round-house at Earlington, Ky. P. P. Huston, Louisville, is purchasing agent.

Mitchell & Shackelford, Danville, Ky., have taken over an automobile repair shop and garage, and may be added to lists of machine-tool and supply purchasers.

Walter Fawkes, Shelbyville, Ky., has installed a machine shop. General repair work will be handled.

Harrison Brothers, Union City, Tenn., are planning the establishment of a factory at Fulton, Ky., for the manufacture of a rainproof cloth.

The Ohio & Mississippi Valley Barge Company, Evansville, Ind., is planning the establishment of a plant to manufacture steel barges. The company has $2,000,000 capital stock. The plant will be located at Henderson, Ky., or Evansville. Henry F. Allen, Evansville, may be addressed.

Two gas engines and two dynamos, belonging to the St. George Hotel, Winchester, Ky., were burned in a fire which caused a loss of $7500. The equipment will be replaced.

The J. D. Hughes Lumber Company, High Bridge, Ky., has begun work on the erection of a new sawmill to replace the one which was burned recently. The building and machinery will cost $20,000.

The city of Henderson, Ky., which suffered $10,000 loss through damage to its municipal electric light plant in a recent tornado, will rebuild the boiler-house entirely.

The Harrodsburg Ice & Produce Company, Harrodsburg, Ky., of which W. N. Brown, Jr., is manager, will increase the capacity of its ice factory from 10 to 20 tons.

It is reported that the Warman & Wolf Company, Madisonville, Ohio, will establish a plant at Covington, Ky., for the manufacture of aluminum products.

The Crescent Stave Company, Whitesburg, Ky., has purchased additional timberland and will establish another mill for the manufacture of tight barrel cooperage stock.

The Chattanooga, Tenn., branch of the Ford Motor Company, Detroit, Mich., will build a three-story building to cost $30,000. A well-equipped repair department will be installed. Plans for the building are now being drawn.

The Union Motor Car Company, Nashville, Tenn., has been incorporated with $15,000 capital stock by E. Fisher Coles, H. A. Jackson, R. C. Jones, and others.

C. F. James, Chattanooga, Tenn., is equipping a building at 613 Cherry street, for use as a garage. A repair department will be operated. The business will be conducted as the Lookout Garage.

The Dayton Ginning Company, Dayton, Tenn., has been organized with Robert L. Godsey as president, and will build a cotton gin at once. A 30-hp. engine is among the equipment to be purchased.

The Miller Brothers Company, Chattanooga, Tenn., has let a contract for the erection of a $40,000 fireproof garage at Broad and West Seventh streets. Equipment for a repair shop will be purchased by the S. L. Mitchell Automobile Company, which will occupy it.

The Loudon Hosiery Mills, Loudon, Tenn., is having plans drawn by H. L. Huntington, Chattanooga, Tenn., for a mill building, which will be 62 x 168 ft., and of fireproof construction. Electric power equipment will be purchased.

The Transmission of Power Company, which has been organized at Nashville, Tenn., with $100,000 capital stock, will manufacture a patented compression pump, motor-driven. Thomas A. Killman and W. L. Danley are among the organizers.

The Beare Brothers Ice & Coal Company, Jackson, Tenn., is in the market for two pumps for the operation of a deep well.

Birmingham

BIRMINGHAM, ALA., August 17, 1914.

The machinery and machine-tool trades have not improved in some time and there is no large volume of business. Indeed, there is some apprehension of a lessening demand, owing to the uncertainty of the moving of the cotton crop, which is the lifeblood of the South. Structural operations and railroad extensions and double-tracking in Alabama are the consoling features. The undercurrent is not pessimistic, but it is not sanguine.

The Birmingham Excelsior Company, of which H. S. Lourie is president, will build a factory at North Birmingham.

The Dallas Cotton Gin Company, Selma, Ala., has been incorporated with a capital stock of $6000 and will build a ginning plant. R. H. Jones is president.

The Hardwood Dimension Company, Mobile, Ala., has been incorporated with a capital stock of $12,000 by W. J. Cooper, W. L. Coble and others. It will manufacture lumber specialties.

The Southern Mining & Milling Company, Tuscumbia, Ala., has been incorporated with a capital stock of $100,000 by H. M. Green, Edgar Bishop, Kansas City, Mo.; W. D. Marshall, St. Louis, Mo., and others and plans to manufacture silicon by a wet process. A plant will be located near Riverton, Ala.

The West Florence Corporation has been organized with a capital stock of $1,000,000, by N. F. Thompson, Birmingham; T. W. Pratt, Huntsville, Ala., and others. It is proposed to develop water power on Cypress Creek. No immediate construction is contemplated.

The Haleyville Oil & Fertilizer Company, Haleyville, Ala., will build a cottonseed oil mill at a cost of $27,000.

The Chattanooga-Tennessee River Power Company, Chattanooga, Tenn., contemplates changes at the Hales Bar hydroelectric plant involving installation of three 10,000-kw. transformers and switching equipment for 120,000 volts.

The J. A. Rentz Lumber Company, Bartow, Fla., has been incorporated with a capital stock of $50,000 to operate a sawmill and novelty works. J. A. Rentz is president.

The citizens of Winnsboro, S. C., have voted $100,000 of bonds for the construction of a waterworks and sewerage system and for the enlargement and improvement of the municipal electric light plant.

Texas

AUSTIN, TEXAS, August 15, 1914.

The bottom seems to have dropped out of the machinery and tool trade in Texas the past week. Very few orders have been received. The situation in Mexico seems to be improving rapidly and it is expected that a large demand for various kinds of machinery, particularly for mines, reduction plants and manufacturing establishments, will soon be manifest. With the shutting down of the sources of supply for machinery and tools in European countries, Mexico must depend wholly on the United States and the geographical position which Texas occupies makes the dealers of this State hopeful that they will obtain a big share.

The Acme Sanitary Flooring Company, El Paso, will construct a factory for manufacturing flooring material. S. K. Albright is one of the owners.

The International Brick Company, El Paso, which has been organized with a capital stock of $200,000, will build a large plant for the manufacture of bricks. The incorporators are William J. Bowen, Albany, N. Y.; William Dobson, Indianapolis, Ind., and Thomas R. Preece, Oak Park, Ill.

S. L. Hodges, Nugent, will construct a pumping plant to irrigate 300 acres of land.

M. J. Addington, Nugent, will construct a pumping plant to irrigate 100 acres of land.

Bartlett & Rainey, San Antonio, Texas, will receive bids until August 24 for a waterworks system and lighting plant for George West, Ganada, Texas.

The Lewis Gin Company, Taylor, will construct a cotton gin. J. R. Lewis is one of the principals.

St. Louis

ST. LOUIS, MO., August 17, 1914.

While the period of uncertainty due to the European war has by no means disappeared, there is a much better feeling in the machine-tool market. Confidence prevails that the commercial and the industrial situations will soon be cleared and that there will be a forward movement in lines which affect the machine-tool interests most directly. A number of inquiries of a tentative character appear, the purpose evidently being to ascertain what can be expected in the case of certain eventualities, but actual business transactions continue at the minimum. Financially the situation is good, for the banks are affording commercial and industrial interests liberal credits and the supply of currency on hand is ample for all legitimate needs. The trust companies are not strictly adhering to the 60-day clause on savings accounts and other evidence is apparent that, as far as this section of the country is concerned, there is no cause of alarm in the least degree.

The St. Louis Screw Company, St. Louis, has increased its capital stock from $600,000 to $750,000 for the purpose of financing extension of plant capacity, plans for which were announced some time ago and part of which are under way.

Fire August 14 destroyed the plant of the Blumer Cabinet Company, 1007 Morgan street, St. Louis. The loss was about $20,000. Wood-working machinery will be needed.

The St. Louis Electric Works, St. Louis, Mo., has been incorporated with a capital stock of $20,000 by Edwin C. Ballman, S. A. Whitton and Emil Doerr to engage in electrical manufacture.

The Bradbury Marble Company, St. Louis, will erect an addition to its plant at 4165-67 Duncan avenue, to cost about $10,000.

The Vitt-Mayes Mfg. Company, Warrensburg, Mo., has been incorporated with a capital stock of $25,000, by H. H. Vitt, F. L. Mayes and S. E. Coleman to engage in general manufacturing.

The Oxygen Gas Company, Kansas City, Mo., has increased its capital stock from $10,000 to $20,000 for the purpose of enlarging its plant.

The Excelsior Springs Water, Gas & Electric Company, Excelsior Springs, Mo., will expend about $52,000 for the extension of its plant and pumping station. S. W. Henderson is manager.

Under a franchise formally granted, F. H. Mudd, Maben, Mo., will equip an electric light plant, and is now in the market for machinery.

The National Spring Wheel Company, St. Joseph, Mo., has been incorporated with a capital stock of $500,000 by William L. Mann, Charles Pearson and Lee C. Brown.

The Chicago, Burlington & Quincy Railroad will equip an elevator of 250,000 bu. capacity at St. Louis, Mo. Automatic equipment will be installed. W. L. Breckinridge, chief engineer, Chicago, Ill. is in charge.

The city of Rockport, Mo., will expend $12,000 in installing a waterworks plant. John T. Wells, city clerk, should be addressed.

Fire at Corning, Ark., August 13, destroyed the Boozer Stave Mill with a loss of $50,000. The mill will be replaced. G. A. Boozer should be addressed.

A drainage contract covering 54,000 acres of land in Arkansas has been awarded to R. H. and G. A. Williams, Chicago, Ill., and Memphis, Tenn., and they are reported in the market for the necessary equipment for the work.

The Factoria Canning Company, Factoria, Little Rock, Ark., has been incorporated with a capital stock of $25,000

by S. H. Newland, Henry W. Horn and G. N. Goodier and will erect a factory at once.

The Co-operative Canning & Storage Company, Leslie, Ark., has been incorporated with a capital stock of $50,000 by A. E. Edwards, Edward Mays and A. T. Hudspeth and will equip a cannery and cold storage plant, with refrigerating equipment.

Carl Shipp, Winnsboro, Ark., will soon be in the market for electric light plant equipment, to increase the capacity of his present one. He will also be in the market for fixtures and supplies.

The New Cleaner Gin, Wilmot, Ark., has been financed by W. E., J. K. and H. O. Barnes with J. L. Standard as manager and will install $6000 of machinery to have a capacity of 50 bales daily.

The Miller Lumber Company, Bald Knob, Ark., has been incorporated with a capital stock of $25,000 by T. H. McHale and others and will erect a saw mill, etc.

The city of Ashdown, Ark., will receive bids within 30 days for the equipment of sewer system, disposal plant and waterworks. The mayor should be addressed.

The report of waterworks construction by the Arrow Engineering Company, Star Building, St. Louis, Mo., in *The Iron Age* of August 13 should have read Arkansas City, Kan., instead of Arkansas City, Ark.

The city of Talihina, Okla., has authorized the expenditure of $15,000 for the extension of the pumping equipment of the waterworks. A. B. Shibley is mayor.

The Arctic Ice Company, Oklahoma City, Okla., has been incorporated with a capital stock of $15,000 by L. L. Land, G. C. Moore and others and will equip an ice-making plant.

The Ardmore Ice, Light & Power Company, Ardmore, Okla., of which H. E. Foster is secretary, will equip an ice plant of 25 tons daily capacity at Ringling, Okla.

The city of Mangum, Okla., has formally voted $100,000 bonds for the equipment of an electric light and power plant. The work is under the direction of the mayor.

The Planters Gin Company, Moorhead, Miss., recently organized by W. M. Carter and others, is in the market for equipment of a six-stand gin, including boiler and engine of 100-hp each.

The Darling Gin Company, Rule, Miss., has been incorporated with a capital stock of $15,000 and will build a cotton ginning plant.

The Illinois Central Railroad, under the direction of A. S. Baldwin, chief engineer, Chicago, Ill., will construct a 500-ton coaling station with mechanical apparatus at Jackson, Miss.

The city of Vicksburg, Miss., will build a system of waterworks and filters, to cost about $340,000. A. M. Paxton is city clerk. The work will be under the direction of A. L. Dabney, Porter Building, Memphis, Tenn. Bids are open until September 21.

R. L. Hines, Baton Rouge, La., is in the market for ice-making and refrigerating equipment.

An ice machine of 10 tons daily capacity is wanted by A. Stern, office 435 Carondelet street, New Orleans, La.

The Sewerage and Water Board, New Orleans, La., of which F. S. Shields is secretary, is in the market for drainage pumping equipment, gate valves, hydraulic cylinders, etc. George G. Earl is general superintendent. These are under contracts 67-D, 68-D, 69-D and 70-D, with bids open until October 2.

F. L. Pantall, Hammond, La., and others will equip a box and veneer factory of undetermined capacity.

The Victor Huber Marble & Granite Company, New Orleans, La., will rebuild its plant recently burned.

The Lyon Cypress Lumber Company, Garyville, La., of which J. W. Gary is president, will equip kiln and mechanical handling capacity for 400,000 ft. of yellow pine daily.

The James Alexander Construction Company, Memphis, Tenn., will equip a pumping plant for a drainage station to protect the northern portion of the city from overflow by the Bayou Gayoso. The entire work will involve about $1,500,000, of which about $300,000 will be for machinery.

The Pacific Northwest

SEATTLE, WASH., August 11, 1914.

The European war has caused a noticeable curtailment in the general machinery trade. The machine-tool market is not directly affected; but has shown no activity for some time, and will doubtless share in the general dullness. The export trade, which was counted on to bring out considerable business in mill and logging, flour and grain-handling machinery, has been almost entirely suspended; and inability to move the grain crop has delayed the placing of orders throughout the interior. About the best feature of the trade now is the Alaskan business, which is said to be larger than for several years. Some machinery shipments are also being taken to the Orient in the Japanese liners, which are maintaining their schedules. Cargoes of lumber and other exports valued at millions of dollars have been tied up until war insurance risks have been determined upon. These cargoes are now stored in the holds of ships in our harbor, waiting for instructions from the owners to leave port. As yet, rates on American vessels in the Pacific have not been increased on account of the war.

The Loew-Victor Engine Company, Chicago, Ill., according to statement of its representative, W. J. Condlon, will soon make Seattle its headquarters. A site for an assembling plant is now being selected. Lewis, Anderson & Foard are its present Seattle agents.

The Nequally Lumber Company, Oak Point, Wash., has been incorporated by C. O. Hill, Harry Syverson, C. C. Woodock, for $25,000. It plans the erection of a mill in Cowlitz county.

The town of Ellensburg, Wash., has voted in favor of the installation of an auxiliary steam pump for the municipal water system.

The Salmon River Power & Light Company, Salmon, Idaho, recently filed articles of incorporation, with C. L. McKenzie, Colfax, Wash., and H. H. Boomer, Spokane, as the incorporators, and a capital stock of $400,000. It plans the construction of a power plant on the Salmon River, to comprise two units of 1500-hp. each. Preliminary contracts will be awarded during the year.

The Mountain Timber Company, Kalama, Wash., whose sawmill was recently destroyed by fire, announces, through John Patterson, its sales manager, that the plant will be rebuilt at once.

The Vallier Mountain Land & Water Company, Great Falls, Mont., has been organized by Patrick Kelly, Conrad; A. E. Schwingel, O. K. Malcom, Wheeler Coy and J. A. McDonough, Great Falls, with a capital stock of $3,500,000. It will finish the Cary land project at Vallier which covers 120,000 acres.

The Humptulips Logging Company, Aberdeen, Wash., has been incorporated by W. P. Brown, W. B. Mack and C. A. Pickford, with a capital stock of $100,000.

The mill of J. R. Powell & Son, Baker, Ore., will be overhauled and enlarged. It has a capacity of 20,000 ft. per day, which will be greatly increased by the installation of new machinery. A new planer is included in the extensions.

The Pacific Coast Pipe Company, Seattle, is building an addition to its plant for the manufacture of wood stave pipe.

The Armstrong Machinery Company, Spokane, Wash., reports an unusually strong demand for refrigerating machinery in that vicinity.

The Willamette Pulp & Paper Company, Oregon City, Ore., is installing a 20-in. centrifugal pump, with a 125-hp. motor.

Catalogues Wanted

The Elliott Mfg. Company, 302 Central Mortgage Building, San Diego, Cal., has been incorporated with a capital stock of $20,000, for the manufacture of a patented hose spray nozzle. It will later expand its line for the manufacture of hardware specialties. The company desires to receive catalogues on machinists' tools, machine tools, small tools, drills, reamers, etc. Adon A. Risley is general manager.

Eastern Canada

TORONTO, ONT., August 15, 1914.

The Stratford Chair Company, Stratford, Ont., has asked permission of the City Council for a siding and space in order that it may double the size of its factory.

The Louison Lumber Company, Jacquet River, N. B., will erect a mill to replace that destroyed by fire. The new equipment will include a band mill of similar capacity to the one destroyed.

The J. C. Low Company, 262 Catharine street, Ottawa, Ont., contractor, will rebuild its planing mill which was destroyed by fire.

J. M. Warren, 30 Vaughan road, Toronto, has purchased a five-acre site and will erect a plant for the manufacture of cement bricks, etc.

The Belgo-Canadian Pulp & Paper Company, Shawinigan Falls, Que., has had plans drawn for the installation of engines and turbines in its mill.

The Windsor Lumber Company, Cameron and Wyandott streets, Windsor, Ont., proposes to erect a planing mill. Up-to-date machinery, driven by individual motors, will be installed.

Fire did damage to the extent of $12,000 to H. A. Marshall's planing mill at 507 Davenport road, Toronto.

The Massey-Harris Company, Toronto, will close down its plant for an indefinite period owing to the present unsettled conditions. The closing of the plant will throw about 5000 men out of employment. Sir Lyman Jones, president of the company, announced that a very large number of European orders were canceled at the first sign of war. The company's London office cabled to stop all shipments, as the Massey-Harris agents at Paris, Moscow, Berlin and other centers could not be reached.

The J. Edward Ogden Company, Ltd., Montreal, has been incorporated with a capital stock of $25,000 by E. S. McDougall, D. P. Gillmor, G. R. Drennan, and others, to manufacture steel, iron, etc.

The Dominion Steel Corporation is understood to have under contemplation the absorption of the Maritime Nail Company, St. John, N. B.

Fire completely destroyed the building of the Davis Tannery, Kingston, Ont. The loss is estimated at $80,000. The plant will be rebuilt immediately.

The ratepayers of Galt, Ont., passed a by-law to grant a loan of $12,000 to the Galt Machine Screw Company, which will erect a plant there.

The Gas-Accumulator Company, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by W. G. Lumsden, C. H. C. Leggott, and others, to manufacture buoys, signals, machinery, appliances, etc.

The Maple Leaf Bedding Company, Ltd., Galt, Ont., has been incorporated with a capital stock of $40,000 by J. C. Dietrich, R. C. Torrance, J. W. Dore, and others, to manufacture beds, springs, etc.

The Niagara Spanish Aerocar Company, Ltd., Niagara Falls, Ont., has been incorporated with a capital stock of $110,000 by A. B. Y. Echeverria, G. T. Y. Polanco, E. J. McIntyre, and others, to manufacture aerial conveyances and machinery and apparatus used in connection therewith.

The W. R. Krafft Company, Ltd., Bridgeburg, Ont., has been incorporated with a capital stock of $100,000 by W. R. Krafft, W. T. Malkin, W. G. Edwards, and others, to manufacture hardware, furniture, etc.

The F. C. Preston, Ltd., Haileybury, Ont., has been incorporated with a capital stock of $40,000 by J. C. Church, S. H. Glassford, G. J. Gibbons, and others, to manufacture steamboats, etc.

The Victoria Foundry Company, Ltd., Ottawa, Ont., has been incorporated with a capital stock of $150,000 by Charles Murphy, Harold Fisher, L. P. Sherwood, and others.

The Glass Garden Builders, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by C. M. Baldwin, W. J. Keens, J. M. Baldwin, and others, to manufacture ventilating and heating apparatus, sash operating machinery, etc.

The Best Weather Strip Company, Ltd., Hamilton, Ont., has been incorporated with a capital stock of $40,000 by M. W. Best, Hugh Thompson, William M. Brandon, and others, to manufacture door screens, ventilators, weather strip, etc.

The Callophone, Ltd., has been incorporated with a capital stock of $200,000 to manufacture callophones, etc. It has appointed John R. Rumble, Toronto, to be its attorney.

Western Canada

WINNIPEG, MAN., August 14, 1914.

Business in industrial lines here was not very active before the European war, but now it is quieter. The monetary situation is not favorable for expansion and the machinery trade is therefore only fair. A steady demand for supplies for repairs to plants of different kinds exists, and a few contracts for new plants are being made. Business is less active than a year ago, and a great deal behind two years ago. The big flour mills are constant buyers of machinery parts, and it looks as if they would have a busy season. The coast lumber mills are not buying as much as usual. If the war continues long works proposed by some municipalities will be hindered.

James Harper, a director of the engineering firm of Marshall & Co., Gainsboro, England, which makes tractors, boilers and other heavy machinery, was recently in Winnipeg. He said that the purpose of his visit was to see if conditions warranted the opening of a branch here.

The civic officials of Calgary, Alberta, say that they will go ahead with the erection of the sewage disposal plant. The money for this was provided some time ago.

It is announced that the Western Canada Flour Mills Company, Ltd., Winnipeg, is preparing to instal new machinery to increase the capacity of the plant and also that its mill at Calgary will be enlarged.

The Powell Lake Mill Company, Ltd., Vancouver, B. C., has been incorporated with a capital of $40,000 to engage in lumber manufacture.

Watt & Gibson, Regina, Sask., contemplate the erection of a planing mill at a cost of $15,000.

The Dunlop Pulp & Paper Mills, Ltd., Winnipeg, has plans prepared for a $150,000-pulp mill. It is not definitely announced when the work will start.

The factory of the Knetchel Furniture Company, Winnipeg, Man., was damaged by fire to the extent of $20,000.

The Beaver River Lumber Company, Ltd., New Westminster, B. C., has been incorporated with a capital stock of $50,000 to manufacture and deal in lumber, timber, etc.

The Vancouver Scale Truck Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $300,000 to manufacture scales, etc.

The Fresh Water Sand & Gravel Company, Ltd., Vancouver, B. C., has been incorporated with a capital stock of $100,000 to manufacture builders' supplies, etc.

The Estevan Clay & Pottery Company, Ltd., Estevan, Sask., has been incorporated with a capital stock of $200,000 to manufacture clay products, etc.

The ratepayers of Swift Current, Sask., will spend $60,000 for the installation of an electric light plant.

The City Council, Vernon, B. C., will start at once to make improvements to its sewage system. The improvements will cost between $90,000 and $100,000. A new disposal plant will be constructed.

The Saskatoon Municipal Railway Company, Saskatoon, Sask., will build a power house.

Bids will be received by H. M. Sutherland, Canora, Sask., until August 25 for the following works: Bid B—Construction of pump house; bid G—Furnishing and erecting pumping machinery. Plans and specifications may be seen at the office of Chipman & Power, Mail Building, Toronto, and Winnipeg, Man., the engineers; or at the town hall, Canora, Sask.

Tenders will be called in the near future for the erection of a new three-story building for the Great Northern Tannery Company, North Edmonton, Alberta.

N. A. Leech, architect, 615 Pender street, W., Vancouver, B. C., is receiving bids for the erection of a factory to cost $12,000.

The Breen Motor Company, Broadway and Sherbrooke streets, Winnipeg, Man., will make extensive additions to its plant. J. N. Semmens is the architect.

The mills of the Fernridge Lumber Company, Fernridge, B. C., were completely destroyed by fire. The loss is estimated at $150,000.

The plant of the Salmon River Lumber & Shingle Company, Sperling, B. C., was completely destroyed by fire. The loss is estimated at $40,000. P. Sills, the president of the company, announced that the plant will be rebuilt.

Government Purchases

WASHINGTON, D. C., August 17, 1914.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, August 11, for furnishing materials for the Navy Yards, as follows:

Schedule 7008, Steam Engineering

Class 1, Brooklyn—Bid A, air compressors, duty paid—Bid 9, $9785 and $10,205; 95, $13,497.90, $14,168.30, and $13,194.05.

Bid B—Bid 14, $11,483.66.

Schedule 7071, Steam Engineering

Class 112, Portsmouth—One heavy universal milling machine—Bid 16, $2726.75 and $2317.75; 87, $2200; 131, $2500 and $2475; 149, $2500; 151, $2068 and $2015; 153, $1900; 162, $2440 and $2659.

Schedule 7072, Yards and Docks

Class 121, Key West—One steam separator and one trap—Bid 29, $411.35; 41, $387; 72, $95, part; 88, $438.60; 96, $616.80; 152, $398.40.

The names of the bidders and the numbers under which they are designated in the above lists are as follows:

Bid 9, Blake & Knowles Steam Pump Works; 14, Bury Compressor Company; 16, Brown & Sharpe Mfg. Company; 29, Crane Company; 41, E. G. T. Colles & Co.; 72, Gardiner Governor Company; 87, Hill Clark & Co.; 88, Harrison Safety Boiler Works; 95, Ingersoll Rand Company; 96, International Oxygen Company; 131, Manning, Maxwell & Moore; 149, Niles-Bement-Pond Company; 151, D. Nast Machinery Company; 152, George A. Newhall Engineering Company; 153, Osterlein Machine Company; 162, Prentiss Tool & Supply Company.

Trade Publications

Oil Engines.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 34-W. Gives general description and specifications for an engine which is designed to burn low grade fuel oil. The description of the engine, which is of the single-cylinder type, is quite complete and is supplemented by a number of engravings of different parts. Exterior and sectional views of the engine are included.

Contractors' Equipment.—Knapp Machinery-Supply Company, 120 Liberty street, New York City. Catalogues Nos. 30 and 40. Contain illustrations, brief descriptions and condensed specification tables for a line of contractors' equipment, which includes concrete mixers, chutes, carts, buckets of various types, skeleton flat cars, stone and cableway skips and derricks.

Dust Blower.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Mailing card. Shows how one of the company's dust blowers is used for cleaning machines in an industrial plant. A brief statement of the work performed by this machine is given, together with a list of other uses to which one of these sets may be put.

Lathe Attachment.—Garrett Attachment Company, Fourteenth avenue and Clinton street, Nashville, Tenn. Pamphlet. Illustrates a milling, gear cutting and drilling attachment for lathes, an illustrated description of which appeared in *The Iron Age*, May 7, 1914. Instructions on the use of this attachment for drilling index plates, cutting keyways, angle and worm gears and drilling holes in shafting are given, together with a brief description of the attachment.

Steel.—Halcomb Steel Company, Syracuse, N. Y. Booklet. Gives a list of various brands of tool steel, together with hints on its use. The labels of the brands are reproduced in colors and mention is made of lines of alloy steels for motor cars, special engineering and machine purposes, railway, mining and quarry steels, and cold-drawn and cold-rolled products. A number of tables of weights and decimal equivalents are included, together with a comprehensive index.

Block and Tackle.—Pull-U-Out Mfg. Company, 909 Pine street, St. Louis, Mo. Pamphlet. Illustrations and descriptive matter explain the operation of a geared block and tackle, having a ratio of 70 to 1, which can be used as a chain hoist, for car setting, releasing stalled wagons, motor cars, etc. The device weighs but 16 lb., is equipped with steel rope, chain, hooks and stakes, so as to be ready for all kinds of work. A number of views showing the device in use are included.

Bolt Threading.—National Machinery Company, Tiffin, Ohio. Circular. Calls attention to the accuracy of the threads produced by the dies of the company's bolt cutting machines and refers to the cutting of a 1-in. thread on 1¼-in. tapered steel blanks at the rate of 50 ft. per min. Views of the stock before and after threading and the machine on which the thread was cut are included.

Internal Combustion Engines.—E. L. Russell Company, Indianapolis, Ind. Pamphlet. Points out the advantages of using the silent valve construction in internal combustion engines. This construction consists briefly of conical or tapered rotary valves and corresponding seats, and is said to possess the advantage of the elimination of the necessity for regrinding and reseating. A number of views of this construction applied to internal combustion engines are given and a complete description of the construction and its operation is included.

Air Compressors.—F. W. Spacke Machine Company, Indianapolis, Ind. Catalogue No. A-60. Devoted to a line of air compressors which are built in the single and three-cylinder styles for capacities of from 3 to 23 cu. ft. of free air per min. The construction of these compressors, which are of the vertical type for belt and motor drives, is touched upon, followed by illustrations with specification tables of the different sizes. Mention is also made of an automatic electric motor control for use with the motor-driven unit and the various accessories that can be supplied.

Melting Ladles and Shear Blades.—American Saw & Tool Works, Fourteenth street and Western avenue, Chicago, Ill. Collection of blotters. Call attention to a line of pressed steel melting ladles with welded or riveted handles and shear blades. Mention is also made of a line of hot and cold metal saws and friction disks.

Storage Batteries.—Titan Storage Battery Company, Chapel street and Lister avenue, Newark, N. J. Brochure. Illustrates and describes a line of storage batteries for electric trucks and pleasure cars, for lighting and ignition systems and for use with the self-starting systems of gasoline automobiles. A brief description of the parts entering into one of these batteries is given, followed by a discussion of the elementary theory of the storage battery. The pasted type plate which is used is described and its application shown to ignition and lighting, starting and lighting and vehicle batteries, the text being supplemented by a number of engravings. Instructions on the making of storage battery measurements are included and there are a number of line drawings showing sectional views of various batteries.

Basket and Box Machinery.—Saranac Machine Company, St. Joseph, Mich. Collection of bulletins. Illustrate and describe a line of box and basket making, wire stitching and stapling machines, a separate bulletin being devoted to each class of machine. In the bulletins engravings of the machines are presented, together with brief descriptions and in some cases condensed specification tables.

Rolling Mills.—Standard Machinery Company, Elmwood Station, Providence, R. I. Catalogue. This is the company's 1915 catalogue describing and illustrating a line of rolling mills that are built in various sizes and styles. The standard mills are first illustrated and dimension tables follow the engravings. Descriptions and illustrations are also presented of special rolling, spoon grading and cross rolling and wire flattening mills. The ball and roller bearings used with the rolls are illustrated and briefly described and mention is made of the company's new wire drawing machine which was illustrated in *The Iron Age*, May 21, 1914.

Lathe Tools.—Ready Tool Company, Bridgeport, Conn. Catalogue No. 12. Mentions a line of tools with inserted cutters for use in lathes and planing and shaping machines. The special advantages claimed for these tools are freedom from breakage and increased output. The various types of tools are illustrated and briefly described, with tables of the sizes in which they can be supplied and a practical table of cutting speeds and feeds is also given. Mention is made of a line of dogs, all of which are also illustrated.

Hinges and Metal Stamping.—C. J. Root Company, Bristol, Conn. Catalogue. Describes a line of wrought brass and steel hinges and stampings. As might be expected, there is practically no text in the catalogue, the illustrations with a brief list of sizes being relied upon to tell the story.

Metal Advertising Novelties.—S. D. Childs & Co., 136 South Clark street, Chicago, Ill. Pamphlet. Presents a large number of engravings of various metal advertising novelties, such as watch fobs, pocket coins, ash trays, letter openers, paper weights, etc. All of the novelties illustrated are stamped from dies and can be finished in practically any of the customary colors.

Centrifugal Pumps.—DeLaval Steam Turbine Company, Trenton, N. J. Catalogue B. Describes the characteristics, design, manufacture, testing, selection and adaptation to various uses of single and multi-stage centrifugal pumps for all capacities and all heads. The text of the catalogue is supplemented by numerous line and halftone engravings of the pumps, together with views of installations. Mention is also made of speed reducing gears and turbine-driven water works pumps.

Corliss Engines and Alternating-Current Generators.—Murray Iron Works Company, Burlington, Iowa. Pamphlet No. 11. Covers a line of Corliss engines which are directly connected to alternating-current generators. A brief description of the engine and generator is given, together with a halftone engraving followed by a description of the generator, with views of some of the parts. The floor plan of the generating set is presented, together with a table of dimensions for different sizes of engines connected to 50, 75 and 100 kva, 60-cycle, three-phase, alternating-current generators. Data on the size of exciter, engine and flywheel required for the various generators are included.

Steel and Malleable Iron.—Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y. Circular. Deals with the metals produced by this company which include two grades of steel and malleable iron. Data on the strength of these metals are presented together with brief statements of the uses to which they can be put.

Recording Liquid Meters.—Yarnall-Waring Company, Chestnut Hill, Philadelphia, Pa. Pamphlet entitled "The Log Book of the Power Plant." Size, 6 x 9 in.; pages, 38. Is a treatise on the use of the Lea V-notch recording liquid meter for all kinds of liquid measurements including boiler feed, condenser discharge, industrial liquids of all kinds, cyanide solutions, irrigation flow, etc. The value of a recording hot water meter, the advantages of measuring boiler feed and steam consumption and the various methods of water measurement are briefly discussed, following which there is a description of the operation of the instrument, together with information on the various types made. The applications of the meter for different purposes are discussed and reports of tests made on it are included. A partial list of users and a series of diagrams and tables, giving the capacities, dimensions, and the shipping weights of the several types are included.